REVIEWS

Text-Book of Polymer Chemistry. By Fred W. Billmeyer, Jr. (Interscience Publishers), 1957. Pp. viii + 518. Price $ 10.50.

The extensive series of researches carried out on the physics, chemistry and technology of high polymers during the past two decades with fruitful applications in the evolution of plastics, elastomers and synthetic fibres of diverse physical properties have formed the subject-matter of several monographs on high polymer science brought out by Interscience Publishers. The present book is an attempt "to gather into one location and to classify some of the more interesting and important information about polymeric substances" for use with graduate level courses in the chemistry of high polymers.

Apart from the introductory part, the book consists of five other parts dealing with the physical chemistry of polymers, kinetics of polymerization, and the properties of plastics, fibres and elastomers. In the section on the physical chemistry of polymers are discussed the methods for the elucidation of their structure, their rheological behaviour, the thermodynamics of polymer solutions, and the determination of molecular weights from studies on the behaviour of polymer solutions, *e.g.*, elevation of boiling point, viscosity and osmotic pressure variations, sedimentation rates and the scattering of light. It may be remarked here that the author is factually inaccurate in stating in Chapter 13 that the details of the relationship between the intensity of light scattering and solute molecular weight were first elucidated by Debye and his co-workers in 1943. This relation had actually been derived and its applicability to the opalescence of protein solutions recognized by Sir C. V Raman as early as the year 1927 in his paper on the "Relation of Tyndall Effect to Osmotic Pressure in Colloidal Solutions" (***Ind. Jour Phys.***, 1927, Vol. II, pp. 1-6).

The rates of reactions, the role of initiators and inhibitors of reactions and their relation to the size of the polymer chain and several typical examples of polymerization and their thermochemistry are but some of the various topics that are discussed in the section on the kinetics of polymerization. The last three sections deal with the properties of plastics, fibres and elastomers, their structure, the methods of their production and their uses, and serve to emphasize the vast developments that have taken place in the industrial production of these high polymers.

This well-written and concise treatise touching on every important aspect of the subject should prove a useful text to students of polymer chemistry. The stimulating discussions on some of the problems in this field requiring more satisfactory solutions and the provision under each chapter of an exhaustive list of references to original papers and other textbooks enhance its value as a reference book to the research worker in this field.

D. KRISHNAMURTI.

Switchgear Principles. By P. H. G. Crane. (Cleaver-Hume Press, Ltd., London), 1957. Pp. viii + 238. Price 25 *sh.*

The book is intended to meet the need for a general understanding and a concise survey of the problems of circuit breaking, of the various methods available and of the apparatus for putting them into practice The author has presented a balanced picture of the theoretical understanding and practical economic engineering demanded by a good switchgear practice.

There are ten chapters. The first chapter deals with the general consideration of the supply and control of electricity indicating the modern trend in grid systems, operating voltages, Busbar arrangements and different transmission systems.

The second chapter deals with the causes of short circuits and overvoltages in power systems and their consequences. The problems of power system stability, short circuit and unsymmetrical fault currents and their calculations are discussed in some detail. The author, however, has not used the m.k.s. units. The per unit method of fault calculations would have been preferable to the percentage method used. The assumption that currents of any particular phase-sequence produce voltage drops in that phase-sequence impedance only is true, only if the power system is balanced under normal conditions in a symmetrical three-phase system, but rendered unbalanced by an unsymmetrical fault.

The third chapter deals with the general problems of protection and protective schemes with circuit breakers. The operating sequences of circuit breakers and the currents and voltages

obtaining in the circuit breakers during operation has been very well explained.

The next two chapters deal with the phenomena of electric discharges and the principles of circuit breaking. After discussing the problems in D.C. and A.C. circuit breaking, the author has explained very well the conditions obtained in restriking voltages, current zero pause and current chopping. The different approaches to circuit-breaker ratings between American and British methods have been discussed in detail.

A chapter each has been devoted to different types of oil circuit breakers, air circuit breakers and to switchgear components. Switchgear recommendation, both for indoor and outdoor use, is discussed in a separate chapter. The last chapter deals with the tests and specifications for H.R.C. fuses and circuit breakers.

A list of references to books and articles published in England on the subject is included.

The book serves as an excellent introduction to the more elaborate books on switchgear and very well meets the need for a comprehensive text-book for students in electrical engineering who are expected to learn some basic facts about the principle and operation of switchgear. The book will also be of interest and assistance to the user of switchgear, as a source of general information.

C. S. GHOSH.

Man-Made Fibre Progress. (*Annals of the New York Academy of Sciences,* Vol. 67, Art. 11, Pp. 897-982.) Edited by J. J. Press. (Published by the Academy), 1957. Price $ 3.00.

This slim monograph is a collection of articles written by specialists on various recent developments in the production and use of man-made fibres. One article deals with the chemistry of producing and processing the "regenerated" fibres, namely, viscose and cellulose acetate. Two articles are devoted to the production of truly "man-made" fibres, such as orlon, decron, and nylon, while another deals with the dyeing and finishing of these. There is a very interesting chapter on the relation between the temperature and moisture content of a fibre and its performance. This chapter defines the first and second order transition temperatures of fibres and describes the importance of these temperatures in operations such as ironing and "tumble-drying". The last chapter gives an account of an attempt to evaluate, in quantitative terms, the various factors which contribute to a user's appreciation of textile fabrics. All articles are written in a style which is not too technical for non-specialists. The book can be recommended to all who wish to acquaint themselves with the rapidly expanding progress in the field of man-made fibres.

T. R.

An Introduction to the Cathode Ray Oscilloscope. By Harley Carter. (Popular Series.) (Philips Technical Library), 1957. Pp. 100. Price 12 *sh.* 6 *d.*

The great facility with which, recurrent as well as transient, electrical and non-electrical phenomena can be displayed and measured to a high degree of precision has put the cathode ray oscilloscope as an indispensable tool in research laboratories and to an increasing extent in industries. The book under review concerns itself with the basic principles of operation of cathode ray tubes and associated circuit elements, and is primarily intended as a guide to technicians, shop engineers and students who have had only a brief acquaintance with electronics. Descriptions of the component parts of the cathode ray tube and their functions, the principles of operation of several types of time base circuits, amplifiers for vertical deflection, pick-ups for converting non-electrical phenomena into electrical magnitudes and power supplies are briefly treated with copious illustrative diagrams. Practical applications of the oscilloscope are indicated. Four complete oscilloscope circuits employing Philips component parts are given, preceded by a data sheet of Philips cathode ray tubes.

A. JAYARAMAN.

International Review of Cytology, Vol 5. Edited by G. H. Bourne and J. F. Danielli. (Academic Press, Inc.), 1956 Pp. vii + 570. Price $ 11.50.

The rise of several new disciplines has expanded the scope of cytology and the boundary between cell morphology and physiology has become rather tenuous. This is reflected in the wide range of topics discussed in the volume under review.

The problem of cell secretion in the pancreas and the salivary glands is considered by Junquiera and Hirsch and recent advances in the cytology of spermatogenesis reviewed by Viswa Nath. The acrosome of the sperm has intrigued investigators. The species specificity of fertilization in Nature is not absolute under experimental conditions. Dan reports on the "Acrosome Reaction" and suggests that only further investigations would fix the specificity of the fertilization reaction on the lysins present in the acrosome.

Vendrely and Vendrely present the recent advances in the study of DNA content of the nucleus by cytophotometry. It would appear that the present trend is to discard the idea of Pasteels and Lison and adopt as a working hypothesis the constancy in the DNA content of the nucleus. "The DNA which appeared to the cytologist as a variable element fixed upon the chromosomes during mitosis and of genetic importance, appears, in fact, as a quantitatively constant element of the nucleus and an important component of the chromosomes" (p. 194).

There are interesting contributions on "Protoplasmic Contractility in Relation to Gel Structuse" (Marsland), "The Chemical Composition of the Bacterial Cell Wall" (Cummins), "Intracellular pH" (Caldwell), "Histochemistry with Labelled Antibody" (Coons), "Theories of Enzyme Adaptation in Microorganisms" (Mandelstam), "Uptake and Transfer of Macromolecules" (Schechtman), and "The Activity of Enzymes in Metabolism and Transport in the Red Cell" (Prankerd).

The mitochondria of the cardiac and skeletal muscle have received special attention in regard to the role they play in the enzyme mechanisms of muscular systems (Harman). The most thought-provoking contribution is that of Sjostrand on the ultra-structural organization of cells. He remarks: "It is striking how few really new structural components have been revealed by the electron microscope as compared with the careful classical light microscope studies" "For the moment it is reasonable to state that the electron microscope studies have not contributed any new, really basic concepts in cell research" (p. 456)

He sounds a note of warning that the data obtained with the electron microscope should be used with caution by biochemists, especially in studies of fragmented mitochondria. Membranes presumed originally to belong to mitochondria are said to appear in every cell fraction and hence they are suggested to be either the numerous membranes observed in the cytoplasm or artificial formations in lipid protein mixtures.

The volume is a welcome addition to any library.

M. K. SUBRAMANIAM.

Spot Tests in Organic Analysis. By Fritz Feigl (Elsevier-Cleaver Hume Press), 1956. Pp. xx + 616. Price 55 *sh.*

The volume under review is the fifth edition of the well-known publications of Prof. Feigl, the second volume of the previous edition now appearing as an independent one. The text has been extended appreciably, a change that will be welcomed by teachers of Analytical Chemistry. The role of spot tests has been progressively on the increase and the close relationship between the choice of organic reagents for inorganic analysis and the problems of qualitative organic analysis have been well brought out. The six chapters cover every aspect of the application of spot test technique with adequate examples and there is enough material provided for the investigator in the field even if one were to make a start. Every test includes not only the principle involved but a detailed indication of the procedure to use and a study of the volume should make it possible for a scheme of analytical technique, even in undergraduate courses, which is systematic, elegant and economical. With courses at Universities in the country undergoing changes, the volume is a very opportune publication that should find a place in every laboratory training students in the techniques of analytical chemistry. A feature that the reviewer should particularly mention is the large number of specific tests which require the use of only reagents that are readily available in any advanced laboratory. The general get-up of the book is of the usual high standard of Elsevier publications.

S. V. ANANTAKRISHNAN.

Colorimetric Analysis. Vol. I. (Second Edition.) By N. L. Allport and J. W. Keyser. (Chapman and Hall). 1957. Pp. xi + 424. Price 50 *sh.*

In the twelve years that have lapsed since the publication in one volume of the first edition of this well-known book, colorimetric methods of analysis have vastly increased in scope and number. This has necessitated expanded coverage of the subject in two volumes. The present volume is confined to clinical and biochemical analyses while Volume Two is expected to deal with colorimetric procedures applicable to metals, foods and pharmaceuticals.

Methods for the determination of over a hundred constituents of clinical and biochemical significance are detailed. The alphabetical arrangement is easy to refer. Each chapter includes a very brief introduction mentioning various available methods, precise details of a selected procedure with illustrations wherever any special apparatus is required and a discussion covering the specificity of the method and other special comments. No theoretical considerations are included and attention is focussed

entirely upon procedural aspects. The book is therefore more a laboratory manual than an exhaustive reference book. Methods selected for description are often those that have proved satisfactory in the hands of the authors. However, a short list of references is included for each constituent which should add to the usefulness of the book as a whole. There are important omissions such as for example in the methods for blood glutathione assay. Determinations that could have been included are, among others, those for *p*-aminobenzoic acid, choline, histamine, vitamin **K**, penicillin, streptomycin and thyroxine.

The book, like its predecessor, will continue to be a valuable aid to laboratories engaged in routine biological analyses.

A. S.

The Biological Action of Growth Substances. *(Symposium No. XI of the Society for Experimental Biology.)* Edited by H. K. Porter. (Cambridge University Press, London), 1957. Pp. 344. Price 55 *sh.* net.

Nineteen papers on the biological action of growth substances, presented at the Eleventh Symposium of the Society for Experimental Biology, are compiled in this volume; ten out of these deal with botanical problems and the remaining nine with animal physiology. The problems on the botanical side relate to apical dominance, germination, root growth, fruit development, tropisms, chemical regulation of growth and sexuality in lower plants; on the animal side, problems connected with endocrine regulation, insect hormones, and fœtal and tumour growth are considered. A brief reference to some important points brought out in discussions on plant physiological problems may not be out of place.

F. G. Gregory and J. A. Veale suggest that the main factor in apical dominance is nutrition and that auxin controls the development of vascular tissues to the axillary buds and thus by a secondary effect deprive the buds of nutrients of all kinds. M. Evenari reviews the mechanism of germination inhibitors and indicates their importance in seed dispersal, in fractionated germination and in confinement of germination to suitable habitats. H. Burström assesses the present position of his theory of the mechanism of root growth in relation to auxin. L. C. Luckwill reviews the topic of fruit development and suggests that auxins act synergistically with some other types of hormonal factors (at present unknown) in the early phase of fruit growth (exception: Solanaceæ and Cucurbitaceæ) and that a number of different compounds may be involved in controlling increase in size of fruits, abscission, maturation, etc. He also believes that IAA may not be of such universal occurrence in higher plants as has been generally supposed. L. Brauner's paper amply illustrates that the mechanism of the perception of the photoperiodic stimulus by the oat coleoptile remains obscure as ever. F. Skoog and C. O. Miller discuss how quantitative interactions between IAA, kinetin and other factors regulate growth from cell enlargement to organ formation. A. C. Braun discusses the nature of autonomous growth in neoplastic plant cells and concludes that a cell acquires the capacity for uncontrolled or autonomous growth as a result of permanent blocking of several growth substance synthesizing systems that are concerned with the development of growth by cell division.

The literature on the subject of growth substances is expanding very rapidly and as such periodical discussions by competent authorities are very valuable for the assessment of progress in this branch of science. For this purpose, this volume should find a place on the bookshelf of every laboratory that is interested in the study of growth substances.

R. D. Asana.

The Liver: Some Physiological and Clinical Aspects. *(British Medical Bulletin*, Vol. **13**, No. 2, May 1957.) (Published by the Medical Department, The British Council, 65, Davies Street, London, W.1.) Price 20 *sh.*

Once again the Editorial Committee of the *British Medical Bulletin* has rendered a signal service to medical science by bringing out the present number on liver and putting within one purview the available knowledge on physiology, biochemistry and pathology of this gland whose vital role in many basic metabolic processes is now well recognized. The previous Bulletins of the series covering such widely divergent fields as neurology and blood coagulation, have been acclaimed by one and all and there is no doubt that the present one on the liver will be received with the same note of welcome.

The Bulletin incorporates altogether 15 contributions dealing with virtually every aspect of liver physiology, biochemistry and pathology. Each article is written by a specialist and is well-documented with references to relevant works. Factual data from personal observations are often adduced by the contributors when making an important statement. The illustra-