

REVIEWS

Capacitors—Their Use in Electronic Circuits.

By M. Brotherton. (Van Nostrand Company Inc., New York), 1946. Pp. 104. Price \$3.00.

"This book is not a treatise on capacitors and neither depth nor originality is claimed," states the author in his Foreword to this useful little book. However, a perusal of it is bound to furnish useful hints regarding the use of these not-quite-understood circuit elements which are so essential in building up any electronic or communication equipment. Though its perusal may not make the reader an expert in the subject, it will help to remove a number of kinks in regard to understanding their behaviour and their subsequent successful applications in practical circuit design.

The book is divided into 9 chapters preceded by a very readable introduction and a summary of practical types of capacitors. Subjects discussed are stability, a.c. resistance, leakage, temperature characteristics and its effect on life of capacitors, etc., all from the view-point of a user. Capacitors using paper, mica, ceramic materials and air as dielectric as well as electrolytic types are each devoted a chapter though information about impregnated paper capacitors takes a major share. A few references to other works on the subjects are given for the more interested reader.

The book will generally be found useful as a quick and readable account of idiosyncrasies of various types of this essential electrical circuit element which is not always well understood and yet is always blamed for mishaps to electronic equipments, often out of sheer ignorance.

N. B. BHATT.

Some Aspects of Red Cell Production and Destruction. *Annals of the New York Academy of Sciences*, 1947, Vol. XLVIII, Art. 7, pp. 577-704. Price \$2.00.

In the above volume, eminent Hæmatologists have reviewed the recent work on the various aspects of the production and destruction of the red blood corpuscles.

Eric Ponder has dealt with the red cell cytochemistry and architecture and states that we are still in the stage of collecting observations and cannot expect to see more than the outlines of the picture. He points out that the components of either the surface structure or the internal structure or both are so arranged as to give the cell its characteristic biconcave discoidal shape. From observations on disc-sphere transformations produced by lysins, the shape-component may be considered to be a supporting ultra-structure, probably, but not necessarily, situated at the surface of the cell, and the permeability-component as being a layer or membrane, only a few molecules thick, situated somewhere in the thickness of the ultra-structure. The analytical data show that 40 to 60 per cent. of the lipid is bound to protein as lipo-protein with considerable differences in different species. There is good evidence

that the thickness of the surface is not uniform. The region of the biconcavity is covered with a thicker structure with a greater protein content than elsewhere.

The possible relation between the various endocrine glands and Hæmopoiesis has been discussed by A. S. Gordon and H. A. Charipper. The supposition that the pituitary produces a specific hæmotrophic factor, they state, is open to question since various, already established, trophic principles have been found to display considerable erythrocytopoietic properties. There is no clear-cut evidence to indicate any role of the posterior pituitary in the erythropoietic process. A relation between the thyroid and erythropoiesis is suggested. Adrenal cortical hormones produce lymphopenia and neutrophilia. Evidence is presented to suggest that the gonadal secretions are responsible for the normal sex difference in red cell count detected in many species of animals. It is usually the male animal which reveals the higher red cell and hæmoglobin values. Further investigation is required to find out whether the hæmopoietic effects exerted by the various hormones are manifestations of their action on general phases of metabolism in the body or of their direct action on the blood-forming tissues.

F. S. Robscheit-Robins discusses the various factors affecting the hæmoglobin and red cell production in experimental hæmorrhage anæmia and points out the importance of diet intake, particularly of certain amino-acids, and iron reserves in the body.

S. Granick deals with iron and porphyrin metabolism in relation to the red blood cell. After describing the structural details of heme units, he points out that the iron required for the manufacture of the heme of the red blood cells is about 3.0 gm.: that is, about several hundred times as much iron is required for the red blood cells as for all the other body cells combined, excluding muscle hæmoglobin, and that specific mechanisms to ensure this supply have been developed in the body. It is interesting to note that a special mechanism exists for the regulation of iron absorption. The ferric iron is converted to ferrous iron by reducing substances in the food at the acid pH of the stomach. Ferrous iron entering the mucosal cells mostly in the region of the duodenum brings about a rapid accumulation of the specific protein, apoferritin, to which the iron attaches itself in the form of micelles of ferric hydroxide, the resulting compound being called "ferritin" discovered by Laufberger. In the mucosal cells, the ferric iron of ferritin is in equilibrium with the ferrous iron. The formation of ferritin helps to maintain the ferrous iron in a state of physiological saturation for several days, thus preventing the absorption of excessive amounts of iron. As ferrous iron moves out into the blood-stream, it is rapidly autoxidised to ferric iron, attaching itself to the β_1 globulin fraction of the serum. In this

manner, it is transferred to the liver, spleen, and marrow, where it may be stored as ferritin or directly utilised by the marrow in the synthesis of heme. We are still ignorant of why the iron brings about the accumulation of apo-ferritin; what enzymes are connected with the dissolution of iron from ferritin; and what enzyme systems are connected with the incorporation of iron into the protoporphyrin ring.

The author further deals with the mechanism of heme synthesis and chemistry of normal heme decomposition. He refers to the fundamental discovery of Shemin and Rittenberg (1945) that glycine labelled with heavy N is the nitrogenous precursor of the pyrrole ring. Acetic acid also appears to participate in this synthesis. Much yet remains to be learned as to how pyrroles are formed from glycine and acetic acid.

William B. Castle refers to Agren and Waldenstroem's recent report that an amino-polypeptidase derived from hog gastric mucosa potentiates the hæmato-poietic activity of orally administered liver in pernicious anæmia and infers that the aminopolypeptidase presumably acts as the gastric (intrinsic) factor. The nature of the food (extrinsic) factor still remains uncertain. He further observes that purified fractions of liver extract possess distinctly greater activity in pernicious anæmia than does folic acid on a comparative dry weight basis.

William Dameshek reviews the literature on hæmolytic mechanisms and discusses the effects of hæmolysins and agglutinins, the passive nature of erythrostasis and the role of the spleen as well as such physical factors as cold, heat, hydrogen-ion concentration, etc.

This volume is of great value to students and workers in the field of Hæmatology.

B. T. KRISHNAN.

Van Nostrand's Scientific Encyclopedia. 2nd Edition, 1947. Pp. 1,600. £3-5 net.

This volume, like the previous one, is a mine of scientific information brought up to date both as regards the number of scientific subjects and the terms dealt with under each subject. There have been added to this edition new sections on Electronics and Radio, Metallurgy, Meteorology, Photography and Statistics. The sections on Aeronautics and Engineering sciences have been considerably expanded.

A particularly advantageous improvement in the facility of reference in this edition is the system of cross-indexing that has been developed. This enables the reader to collect easily the maximum of information that bears directly on all included topics. Every description is concise and perfectly lucid. The numerous illustrations make the comprehension of subjects still more easy. The meticulous care of the authors together with their cross-referencing, the small, neat print and the durable get-up have contributed in great measure to the inclusion of so much material within the covers of one volume. The reviewer, however, feels that the editors and publishers have been a little too ambitious in including such a vast number of scientific subjects in a single, wieldy volume. The natural consequence is that the *Encyclopedia* fails to fulfil its purpose of being

exhaustive. A random sample survey showed, for instance, that Choline, Acetylcholine and Phosphatide are missing under chemistry and phage. Bacteriophage, Salmonella and Glycæmia are not included among the medical terms. Interference, as an optical phenomenon, has not been described. Neither insecticides nor Gammexane find a mention in the volume. An Engineer might miss quite a few in his subjects. Instead of, therefore, trying to be so entirely comprehensive, it will be far more useful if the editors could plan two volumes, one for pure and the other for applied sciences. Such an effort has obvious advantages.

Considering the volume of printed material in the book, errors are far too few indeed. The reviewer came across hardly two printers' mistakes—one (p. 69, line 37) haloid for halide, and the other, a little less excusable (p. 1070, line 9), in the formula for pyrogallol, $C_6H_3(OH)_3$ for $C_6H_4(OH)_3$.

We are confident that the famous publishers will bear these suggestions in mind and improve upon the present edition even as they have done on the last one.

With all the minor defects and omissions this is a 'must' reference book, as the Americans call it, for every science library.

K S R

Enzymes and Their Role in Wheat Technology. American Association for Cereal Chemists Monograph Series. Edited by J. Ansel Anderson. (Interscience Publishers, Inc., New York), 1946. Pp. 371. Price \$4.50

This volume is the first of a projected series of monographs sponsored by the American Association of Cereal Chemists, "primarily as a service to its members". The book starts off with a good chapter on the general chemistry of enzymes. Then follow twin chapters for each of the particular enzymes—amylases, esterases, oxidases, proteases and the fermentation enzymes, every chapter being written by a specialist. In the first of these twin chapters a fairly general treatment of the enzyme concerned is given, while the second chapter is meant to be a discussion on the part played by that enzyme in wheat technology. Each chapter comprises a bibliography, besides the usual author and subject index at the end of the book.

Although an avowed purpose of the book is its emphasis on the role of enzymes in wheat technology, the elaborate treatment of the pure chemistry of enzymes appears rather out of balance in the book. The editor is not altogether unaware of these faults. Here is his apology: "With several authors involved . . . a certain amount of overlapping is difficult to avoid." It is still difficult to understand the inclusion in the text of any treatment on enzymes that have no or very doubtful role in wheat technology. Chapter V on esterases is just a case in point, best illustrated by the following remarks of the author of this chapter (p. 153): "The esterases of plants have not been investigated as extensively as the amylases and the proteolytic enzymes and, therefore, a discussion of the function of the esterases as applied to milling and baking problems is

necessarily limited" and "... since data in this field are no meagre; it will be necessary to borrow freely from research done on other enzyme sources, both plant and animal."

If there were an International Board of Editors, rigidly regulating the publication of technical books in strict conformity with current needs and economy standards, it is doubtful whether the book would be passed as it is.

But all this is not to deny the excellent get-up of the book and the profundity of certain of the chapters on the pure chemistry of enzymes, notably those on oxidases and proteases. It is hoped that the less initiated wheat technologist will find himself able to drink deep at this well of knowledge.

S. N.

Methods of Vitamin Assay. Published for the Association of Vitamin Chemists, Inc., by Interscience Publishers, Inc., New York, 1947. Pp. 189. Price \$3.50.

The difficulties felt even by the experienced analyst in vitamin assays in natural products are in no small measure due to the lack of a single co-ordinated procedure for the analysis of a particular vitamin in a given material. The methods gathered from literature and adopted, vary very widely for the different materials, and the accuracy of results obtainable by each being doubtful, the analyst is usually thrown back on his own resources to select the procedure best suited to him and devise his own modifications. Much of the confusion is due to the omission of necessary details of procedure in the technique. The analytical methods showing specificity to the operators is also a common experience, even to the skilled analyst, when methods reported to be applicable do not give concordant results at his hands. The literature on analytical procedure for vitamins is vast and varied. Every vitamin analyst must have felt how welcome it would be to have on hand a publication containing a detailed description of the tested and authentic analytical methods for vitamins in different materials.

In publishing this handy manual the editors have satisfied a long-felt need, and in their treatment of the subject have shown real appreciation of the difficult task they have undertaken and have conspicuously succeeded in bringing out a work of merit.

The book under review is the result of collaborative effort of the Association of Vitamin Chemists, founded in 1943, with the co-operation of experts from scientific laboratories all over the country. The various methods for the assay of different vitamins described in the book are those which have been verified by collaborative assay.

The important aspects of the sampling, preliminary treatment and methods of calculations are given in the commencing chapter. Detailed description of standard methods for assay and calculation for the vitamin A and its precursor, vitamins B₁ and B₂, Niacin and ascorbic acid are given in the following chapters. The rest of the vitamins for which critically evaluated methods are not yet available are listed in the eighth chapter with references to literature. In the concluding chap-

ter the use of check samples in control of vitamin methods and the preparation and storage of the samples used in standardisation of methods are discussed. Wherever details are necessary for accuracy, emphasis has been laid on them and explanation given at length.

A notable feature in the various chapters is the detailed notes on each method together with a complete list of apparatus, chemicals and working of instruments used in the analysis. Reference to literature at the end of each chapter adds to the usefulness of the book. Perhaps inclusion of a list of vitamin contents of natural products would have been a welcome feature.

C. N. BHIMA RAO.

Annual Review of Biochemical and Allied Research in India, Vol. 16, 1945. (Society of Biological Chemists, Bangalore, India.) Price Rs. 3.

The present issue of the Review, like the previous ones, comprehensively reviews the researches in Biochemistry including the related aspects of medicine and nutrition in India. Giri and Das have summarised the work on Enzymes, describing in some detail new methods of estimation of enzymic activity, and of biological constituents with enzymes. Researches carried out in 1946 have also been included in this section. Bashir Ahmed and Vohra have brought together the work on the various vitamins. The finding that shark liver oil derived from low pressure extraction is far less rich in vitamin A than steam-extracted oil promises scope for further work, and the fact that calciferol, as a substitute for ergosterol, fails to support the growth of certain larvæ perhaps explains why calciferol sometimes fails as a cure for human ricketts. It is also noteworthy that the symptoms of ascorbic acid deficiency might manifest themselves in the form of pseudoparalysis in the absence of scurvy.

Ranganathan's review on general Nutrition draws attention to the importance of careful and correct presentation of scientific findings to the public as, otherwise, wrong notions (like cooking in copper vessels to preserve vitamin C in food) on an important subject might take root in the minds of lay people. Gross deficiencies in protein, fat, meat and milk in the Indian diet have been stressed as usual, and references have been made to suggestions for ameliorative measures.

A notable observation in nutrition is that while casein and calcium lactate either singly or together exert a growth-promoting effect on a predominantly carbohydrate diet, butter alone has an adverse effect, but together with casein exerts a beneficial effect. This naturally indicates either that casein makes up, as the workers have suggested, a factor deficient in rice for the utilisation of dietary fat, or serve to counteract a possible inhibitory effect of butterfat. In this connection, it is not quite correct to state that calcium lactate is an ingredient of milk, for most of the calcium in milk exists in combination with protein, and not at all as a salt of lactic acid.

The changes in the content of the vitamins of the B complex on souring milk

are of significance in the Indian dietary where- in soured milk generally finds a place. Ray has briefly enumerated the year's findings in Animal Nutrition, and Basu has resented a critical summary of the work on Metabolism. In the latter section tapioca is consistently misspelt as *topioca*.

It is felt that if the entire work on Nutrition had been critically reviewed either by the same reviewer or by the different reviewers in collaboration with each other a more cogent and comprehensive picture of the subject in a single perspective could have been presented.

Study of normal movement of the colon of apparently healthy Indians, Europeans and Anglo-Indians by Moller shows that it is faster in Indians than in Europeans. There was no difference in pulmonary tuberculosis unless there was evidence of involvement of intestines in which case there was hypermotility. Chakravarty has found urea, non-protein nitrogen, chloride and cholesterol in the blood of young adult Bengalis lower than in those of non-Indians and those of people of Bombay province. Using Russell's viper venom as a source of prothromboplastin Rahman and Giri found average prothrombin time for healthy blood to be ten seconds, which was found to be prolonged in tuberculosis, malaria, jaundice and anaemia. It is significant that they found no relationship between plasma prothrombin and serum calcium. The important role of dietary histidine in regeneration of haemoglobin and R.B.C. has been shown by Yeshoda. Repeated multiple pregnancies neither elevate blood pressure nor cause a rise in incidence of toxæmia. The toxic factor in earlier pregnancy is unknown. This is shown by Corary's work among rural women in Ceylon. Even among individuals of the same race blood group distribution is influenced by environmental factors as shown by Mazumdar's work.

Antibacterial properties of two compounds related to merthiolate were studied by Bhattacharya and Gupta. Dharmendra and Mukherjee found sulphapyridine and sulphanilamide lethal to *B. lepræ muris*, *in vitro*, but failed to cure the infected animals. Bose describes a powerful non-toxic antibiotic against Oxford strain of *S. aureus*, *B. typhosus* and *V. cholerae*. He isolated it from the filtrate of the culture of *Polyporus*. Lactones having anthelmintic properties have been prepared by Paranjpe and others. Ahuja and Brooks claim success in their method for estimation of antihaemolytic titre of cobra antivenene. Bose and Ghosh have described an easier and reasonably satisfactory method of assaying adrenaline solutions in guinea-pigs.

The chemical method of assaying anthracene purgatives evolved by Ghosh and others is claimed to be better than bioassay. Sahasrabudhe has made an interesting observation on oestrogenic activity in lipase obtained from defatted castor seeds. But he does not say whether olive oil, which he used as solvent for lipase, is free from that activity. Bose and Mukerjee have found that the narcotic properties of hemp resin-charas in the alkali-insoluble fractions, whereas soluble fractions were inactive. The alkaloidal content of Indian lobelia is reported to be greater if collected in suitable localities during October-November. The ether extract

alone is of doubtful therapeutic activity. Cnopra and others have isolated an alkaloid from *Inula royiena*. Some of the alkaloidal bases of argemone oil, a common adulterant of mustard oil, are suspected to be the possible causative agents of Epidermic dropsy. Ranganathan could not find any correlation between toxicity and solubility of fluorides, because magnesium fluoride which is insoluble in water is more toxic than soluble sodium or calcium fluorides. He has reported the mitigating influence of calcium in experimental fluorosis.

Panja and others have found sweet and sour curds similar in bactericidal action on *V. cholerae*, *B. typhosus* and *B. dysenteriae*. Lactic acid was found to be chiefly responsible for this action. Panja has described an easy method of obtaining a rough variant of *V. cholera* by adding a small fraction of atebirin to the culture medium. Owing to the frequent occurrence of *B. paratyphosus* and *B. enteritidis* infection the advisability of incorporating these organisms in the prophylactic typhoid vaccine is suggested. Menon's observation of the co-existence of *G. Intestinalis* and *Fuso spirochaetes* in some obscure cases of diarrhoea deserves further study. In a critical study of eight cases of "tropical Eosinophilia" it appears that the syndrome is of an infective origin, although some observers consider it an allergic phenomenon. No evidence of toxicity was observed in a series of 24 cases of serum transfusion where nearly 1,000 c.c. of the serum was transferred. Cardiovascular and other changes in a group of fifty cases of diabetes were studied by Chakravarty. A number of modified media for easy identification of intestinal pathogenic organisms have been described by various workers. A useful technique by flotation with copper sulphate solution for concentrating *E. histolytica* cysts has been described. By the incorporation of 200-1,000 units of penicillin in the culture medium, *L. tropica* was isolated from skin cultures free of staphylo and streptococci. The unsuitability of white mice for the study of leptospirosis has been noted by Lahri and Das Gupta. An interesting case of splenic cyst due to malarial enlargement and subsequent atrophy of splenic pulp has been described. Veeraraghavan's finding of a protozoal parasite in the central nervous system of animals suffering from rabies is a revolution in the idea of the etiology of rabies. The method of cultivation of the brain of suspected cases of rabies is described by the author as a surer and quicker method of diagnosis. An effective polyvalent antisnake venom serum useful against all the common snake venoms of India has been prepared by the Haffkine Institute. The serum is available in lyophilised form which can be stored in ordinary condition without affecting the potency for a considerable time. Improvements in the serological test for diagnosis of typhoid fever, Kala-azar, cholera and leptenhis are described by different authors.

Billimoria and Jacobi have investigated the relationship between tuberculosis and carbohydrate metabolism by sugar tolerance test. A case of tuberculosis lesion of the cranial bone which is rare has been described.

K. S. RANGAPPA.
K. P. MENON.