

This is not always an advantage for no amount of descriptive matter can have the unambiguous meaning of a mathematical statement.

On the whole the book will be found quite useful by workers in the electrical industries and by students who wish to be familiar with the practical uses to which the Cathode-Ray Oscillograph is put in industry.

N. B. BHATT.

**Manometric Methods.** By Malcolm Dixon. (Cambridge University Press, London), 1943. Second Edition. Pp. xiv + 155. Price 8/6.

It is a decade since the first edition of this book was written; during the period, this little book has inspired and guided successive batches of students of biochemistry in the adoption and experimentation of manometric technique which constitutes one of the most convenient, elegant, accurate, and widely practised methods of measurement in biochemical research.

Since the publication of the first edition, several refinements and improvements in the method have been effected; its applications have been extended. Micro and ultra-micro adaptations of the technique, capable of measuring volume changes of the order of one-millionth of a cubic centimetre, have been developed. The second edition, under review has been revised in the light of these developments.

Adequate recognition has not been given to Dr. Linderstrøm-Lang, who has been entirely responsible for developing the cartesian diver ultra-micrometer. From the volume one gains the impression that Dr. Linderstrøm-Lang was responsible only for the "suggestion"; it should, however, be added that the experimental technique and the applications of this ultra micro method were all thoroughly worked out at the Carlsberg laboratories in 1937 when the reviewer was working there.

The list of some further applications of manometric methods, the three appendices giving examples of standard experiments, and the table logarithms, add to the usefulness of the book.

**The Application of Absorption Spectra in the Study of Vitamins, Hormones and Co-enzymes.** By R. A. Morton. (Adam Hilger Ltd., London), 1942. Second Edition. Pp. 226. Price 28s.

In a series of ten illuminating chapters, the author covers the entire field of vitamins, hormones, proteins, enzymes and co-enzymes in a broad and interesting manner suggestive of their inter-relationships. The first chapter gives a short account of the experimental assembly and the notations used in absorption spectrophotometry. References to literature where the technique of spectrophotometry is described at greater length, are given at the end of the chapter.

The second chapter is devoted to a consideration of the steroids including the closely allied antirachitic vitamins and sex hormones. Those interested in gaining an insight into

absorption spectra in relation to chemical structure, will find this chapter exceedingly interesting and valuable. The subject of vitamins of the D group is treated against its historical background; reference is made to the difficulties encountered and to the precautions necessary in carrying out a spectrographic assay of vitamin D in natural products. The author has incorporated a substantial amount of his own experience in this field.

The third, the fourth and the fifth chapters respectively deal with (1) Provitamins and Vitamin A, (2) Vitamin E and Antioxidants, and (3) Vitamin K. They constitute a succinct and stimulating review of the vitamins of the fat-soluble group; the part played by spectroscopy in the discovery and development of these vitamins is indicated. The discovery of vitamin A, is directly the outcome of spectrographic methods of analysis. Those interested in the assay of the carotenoids and vitamin A should carefully study the relevant portions of the third chapter wherein attention has been drawn to the wide variability in the biological utilisation of  $\beta$ -carotene. The author adds: "When the chemist analyses a given product for vitamin A or provitamin A, he aims at a precise determination of the actual amounts present, whereas the biochemist's animal assay is concerned with available vitamin A or carotene. If a large proportion of the total is nutritionally useless, as often happens, it may be necessary to change the method of preparing or cooking the food, or to alter the bulk composition of the diet so as to improve utilisation. In short, the problem of vitamin A nutrition has emerged from a phase of spurious clarity, resulting from over-simplification, into a very complex phase in which the main task is the twofold one of refining both analytical methods and biological methods without confusing the many variables or failing to stress the distinction between vitamins and provitamins A."

Methods for the assay of butter with respect to its carotene and vitamin A contents, details for the assay of blood-serum for its content of vitamin A and carotenoids, and for the determination of carotene in dried grass and similar products, are described in the third chapter.

The water-soluble vitamins C and P and the B complex are treated in the sixth and the seventh chapters. The closely related and physiologically important group of purine and pyrimidine derivatives are dealt with in the eighth chapter. These compounds represent the products of degradation of some of the vitamins, nucleic acids, viruses and coenzymes. As the author remarks, "Spectrophotometric studies on purines are relevant to the study of coenzymes and the data on the pyrimidines to the problem of the structure of aneurin".

A discussion of the position of the absorption spectra of proteins in general, forms the subject of the ninth chapter; excepting for the fact that a spectrographic method for the detection and estimation of tyrosine and tryptophane has been developed, spectroscopy has contributed little to elucidation of the complexity of this class of compounds.

The discussion of purines, pyrimidines and proteins is appropriately and logically followed by the last chapter which gives a clear account of the apo- and co-enzymes of the oxidation-reduction group. Spectroscopy has played a fundamental rôle in the study of these systems; in fact, the only accurate and specific method for determining the activity of many of the coenzyme linked enzymes is the one provided by the spectrograph.

The author has rendered a great service to the science of spectroscopy as applied to the study and elucidation of problems of biochemical interest. The world-renowned and the progressive firm of Adam Hilger has sponsored the publication of this volume.

#### Annual Review of Biochemistry, Vol. XII.

By James Murray Luck and James H. C. Smith. (Annual Reviews, Inc., Stanford University P.O., California), 1943. Pp. ix + 704 Price \$5.00.

The impression created by a cursory glance of the Annual Review for 1943, is one of satisfaction that the progress of biochemical science has not been appreciably affected by the unhappy and emergent conditions imposed on scientific research by the global war; the volume of work as reviewed in the volume appears to be substantial in spite of the fact that much of the work conducted in the central and occupied Europe and in Japan has not generally been available to the reviewers.

The volume consists of twenty-four reviews and covers as usual, the fields of biological oxidations and reductions, enzymes, hormones, vitamins and viruses, metabolism of carbohydrates, fats, proteins, amino acids, minerals and sulphur compounds, the chemistry of steroids, lipins, carbohydrates, proteins and amino acids. Other topics reviewed include animal pigments, synthetic drugs, photosynthesis, carbon-dioxide assimilation by heterotrophic organisms, electron microscope in biology and micro-chemistry.

The fat-soluble vitamins has been reviewed by Hickman who is one of the pioneers in the application of the principles of molecular distillation to the isolation and production of integrally pure vitamins and vitamin concentrates. He refers to some of the spectacular achievements in this field, still in the course of publication. The occurrence of what the author calls a post-vitamin (kitol) in whale oil, which on simple distillation gives rise to vitamin A, has been announced. This pyrolytic conversion of kitol into vitamin A represents the first instance of the *in vitro* transformation of a pro-vitamin into a vitamin. The next few

years will no doubt witness a rapid development not only in the chemistry and biogenesis of this interesting product but also in the commercial production of vitamin A from this source.

The assimilation of carbon-dioxide by heterotrophic organisms has formed the subject-matter of several reviews during the last two years. Another review on the same subject by one of the foremost workers in the field deals with the phenomenon as revealed by micro-organisms and serves to elucidate the mechanism and significance of carbon-dioxide assimilation. Attention should be specially invited to the thought-provoking review on the water-soluble vitamins by Roger J. Williams, who has discussed and critically appraised such of those pieces of work "which contribute new and crucial information regarding the chemistry or biochemistry of vitamins" and "which are most stimulative of further research along these lines". The relation of the vitamins of the B-complex to general metabolism, to embryonic development, to chemo-therapy, to hormonal control and to some of the diseases like pernicious anæmia and cancer. Particularly interesting is the suggestion that the B-vitamins influence the mental and psychological qualities in man. Reference is made to the unsatisfactory state of the chemistry of pyridoxin and evidence has been adduced to the occurrence of a pseudopyridoxin which, towards certain organisms, is a thousand times more active.

There is a review on the Electron microscope in Biology by L. Marton, a subject which is coming into practical prominence in recent years. With the aid of this new and powerful tool, deeper insight has been gained into the morphology of micro-organisms, the architecture of viruses and the adsorption phenomena.

The chemistry of viruses is discussed by Hoagland, with special reference to the animal viruses which have not been obtained in a state of the same degree of purity which characterises plant viruses. The author sounds a note of warning that "as a consequence of the great advance which has been made in an understanding of the properties of plant viruses, there has been \* \* \* a too hasty extension of ideas gained from these studies to the formation of over simplified concepts of viruses in general, and animal viruses in particular".

In the preceding paras, reference has been made only to a few of the more important high-lights of biochemical research reviewed in the volume. Biochemical investigators throughout the world are familiar with these publications and will continue to eagerly look forward to its annual appearance.