

REVIEWS

Electricity, Magnetism and Atomic Physics. (Vol. II). *Atomic Physics.* By J. Yarwood. (University Tutorial Press Ltd., Clifton House, Euston Road, London N.W.1; India: Oxford University Press, Madras-2), 1958. Pp. viii + 644. Price 40 sh.

The present volume is a concise and at the same time a comprehensive text-book on Modern Physics dealing with the fundamentals of the study of electrons, ions, atomic structure and atomic radiations. As a companion to the earlier volume on classical Electricity and Magnetism, it is but natural that the historical development of the subject should be kept in view. Thus the classical quantum treatment of atoms and atomic spectra are dealt with in detail while the more fruitful method of wave-mechanics is confined to a single chapter which gives the main principles of this approach.

The book is divided into two almost equal halves, the first ten chapters being devoted to extranuclear phenomena and the remaining eleven chapters to radioactivity and nuclear phenomena including cosmic rays.

The book is up-to-date and includes latest topics which have been fairly well established in physical theories and as such should find an accepted place in a modern text-book.

The chapter on Nuclear reactors is particularly instructive and besides dealing with the principles involved in thermal reactors, it also gives brief details of the reactor at the Calder Hall Power Station.

The book is interspersed with worked examples and at the end of each chapter there are exercises and questions mostly taken from University papers. The sequence of treatment and the clarity of expression show that the book is written by an experienced teacher who is keenly aware of the needs and difficulties of examination-going students. The book will form an adequate text-book on Modern Physics for Honours and Degree students with Physics as the major.

The reviewer in his perusal of the book noticed a small error on p. 122, line 3 from bottom where 'm' in the equation is redundant.

The printing is bold and clear and the get-up is good.

A. S. G.

Structure Reports. Vol. XIV. General Editor. A. J. C. Wilson. (International Union of Crystallography), Pp. 215. Price. \$ 9.50.

The present volume represents, in the main, the cumulative index of structure reports for the years 1940 to 1950. The subject and author index are arranged alphabetically. In the formula index, the constituents are arranged in the alphabetical order of the chemical symbols. An additional index for carbon compounds is included, in which the primary classification is by the number of carbon atoms and the secondary classification is by the number of hydrogen atoms. A cumulative index for metals appears separately. A corrigenda for Volumes 8-130 appears at the end. The volume also contains a few actual structure reports. It may sound superfluous to elaborate on the usefulness of a cumulative index provided such an index has been compiled with care and forethought, as has been done in the present volume.

A. J.

Principles of Electronics. Second Edition. By H. Buckingham and E. M. Price. (Cleaver-Hume Press Ltd., London), 1958. Price 17 sh. 6 d.

This book, the ninth in the Cleaver-Hume Electrical Series, has a two-fold objective: to survey the fundamental processes of electronics and the theory and uses of the common electronic devices, and to describe the role of electronic apparatus and methods in engineering and industrial problems.

The first part of the book, after discussing atomic structure, radiation, electron emission, electron beams and semiconductor phenomena, describes the characteristics of vacuum and gas tubes, photo-electric tubes and cathode ray tubes, and traces the evolution of special purpose tubes such as the disc seal triode, the magnetron and the Klystron and the family of television camera tubes. The latter part of the book gives an exposition of the general principles of rectification, amplification, modulation and detection. Then follow a series of chapters dealing with practical applications: the use of photocells in illumination problems, in measurement and in industrial control; induction and dielectric heating; electric

welding; motor controls and register controls; measuring devices; electronic counters; proximity detectors; particle accelerators; and the electron microscope.

Mindful of recent progress in the subject, this second edition introduces two chapters dealing with magnetic amplifiers and transducers and junction rectifiers and transistors. In the interests of brevity, the explanations are somewhat oversimplified, but enough is said to arouse the curiosity of the reader and bring him an awareness of the many-sided advances that are taking place.

The book, though lucidly written, is not detailed enough to be prescribed for students in electronic engineering. But the material it presents will interest and greatly aid those to whom it is addressed, namely, students in electrical and other branches of engineering that have begun the use, on an increasing scale, of electronic methods and devices.

S. SAMPATH.

Indian Ephemeris and Nautical Almanac, 1960.

(Published by the Manager of Publications, Civil Lines, Delhi). Pp. xxvii + 444. Price Rs. 14.00 or 22 sh.

The present issue of the Ephemeris for 1960 is a definite improvement over the first two issues for 1958 and 1959, and it is gratifying to note that in the preparation of this issue due attention has been paid to the most important shifts in international practice regarding the preparation of allied publications. Such an outstanding change introduced in this year's issue is the use of Ephemeris Time instead of Universal Time for the indication of the positions of the sun, moon and the planets. The short account given in the Introduction explaining the genesis of this change is very clear and convincing. Further improvements consist in the addition of ten new tables indicated on pp. v and vi of the Preface, accompanied by suitable explanations relating to them.

The section relating to the Indian Calendar has also been enriched by the addition of an extra table on pp. 420-21 giving the longitudes of the sun, moon and the planets for the period 1st January to 22nd March, 1961, in order to facilitate the preparation of Indian Panchangas for one complete Indian year. In this connection, one would naturally raise the question as to how far the publication of the Indian Ephemeris and Almanac for the last three years has helped in improving the accuracy of the several indigenous almanacs in the

country. We regret to say, however, that such an influence has been little or negligible as shown by the fact that many such almanacs in vogue in several parts of the country, which we recently had an occasion to see, are still hopelessly inaccurate even as regards fundamental data. It is, of course, unfair to expect the publishers of the Indian Ephemeris to undertake the task of reforming our indigenous almanacs, but it is desirable that an agency should be set up to undertake the introduction of these reforms.

A short review like this is not the proper place where one could indicate in detail the several improvements introduced in the present publication. It is nevertheless true that there are plenty of such improvements, and, in particular, the get-up, and the printing of the several tables are very well done. We hope that this excellent publication will be more widely used hereafter, and will serve as an incentive to the development of Indian Astronomy specially on the observational side.

B. S. MADHAVA RAO.

Chemical Analysis. Vol. III. (Colorimetric Determination of Traces of Metals.) Third Edition, Revised and Enlarged. By E. B. Sandell. (Interscience Publishers, Inc., New York-1), 1959. Pp. xxii + 1032. Price \$ 24.00.

Colorimetric methods for the determination of metal traces have found so many new applications and are so universally practised that an up-to-date survey of the subject as has been attempted in this volume is most welcome. This volume is divided into two parts, the first of which deals with the general aspects of inorganic trace analysis in a very readable manner while the second describes succinctly the procedures for 48 elements and the rare-earths.

This book will be read with great interest and profit both by the beginner as well as by the advanced research worker and the professional analyst. The presentation of the subject-matter and the get-up are excellent but the price is rather high.

K. R. K.

Biochemical Society Symposia No. 16—The Structure and Function of Subcellular Components. (University Press, Cambridge, U.K.), 1959. Pp. 100. Price 15 sh. (Paper bound.)

The structure and function of Subcellular components edited by E. M. Crook (Cambridge

University Press, 1959) contains several important contributions summarising the prevalent concepts about the ultrastructure of cell membranes and the properties of the cell membranes with reference to transport of metabolites. In particular, the article by J. D. Robertson presents a fairly comprehensive compilation of the more recent developments in the field of cell membrane structure and is very stimulative, emphasising as it does, the somewhat speculative hypothesis that several cells have double membranes elegantly discernible by electron microscopy. Though the conclusions presented are largely derived from a detailed study of unmyelinated nerve fibres, they are probably of a more general significance, and suggest several lines of further investigation. The large number of diagrammatic representations and photomicrographs are very valuable. This is followed by an interesting article by S. J. Holt on the application of some promising cytochemical staining reactions for the study of intracellular enzyme distributions, based upon the use of indigoid dyes. Ernstor's presentation of his more recent work on the distribution and interaction of enzymes is highlighted by his discussion of the relationship of Krebs' cycle enzymes to mitochondrial structure. "Structure and Function in Microorganisms" by P. Mitchell is mainly concerned with the problems of active and passive transport of metabolites across microbial membranes and is notable for the lucid presentation of the general theories of membrane transport. The symposium concludes with an article by J. D. Judah and K. R. Rees on the changes in cellular components such as Diphosphopyridinenucleotide brought about by carbon tetrachloride injury. The book is well worth a careful study by all those interested in the relationship between cell structure and metabolism.

P. S. SARMA.

Proteins in Foods. By S. Kuppaswamy, M. Srinivasan and V. Subrahmanyam. (Special Report Series, No. 33.) (*Indian Council of Medical Research*, New Delhi), 1958. Pp. iii + 289. Price Rs. 12.00.

Proteins are important constituents of plant and animal cells. While plants synthesize proteins from simple inorganic elements of the soil, animals have to depend on ready-made proteins and their breakdown products. Dietary surveys in India show that the bulk of the food in Indian dietaries consists of cereals and pulses which supply about 80% of the total energy and are the major source of dietary

proteins. It has been reckoned that 10 to 14% of the calories in the diets of populations in economically advanced countries is contributed by protein. This level of protein calories is not likely to be reached in diets based predominantly on cereals, tubers and pulses which are consumed by large sections of the population in India. A better nutritional status can be achieved by placing before the people all available knowledge on the protein content and the protein quality of various food materials produced in respective localities so that they can intelligently select from among them the best possible balanced diet without incurring much additional cost to the family budget.

The present review on "Protein in Food" gives us information on protein contents of different food-stuffs including their nutritive value and amino-acid composition under each class of food-stuffs and a survey of the entire literature on the subject. Tables are given under each chapter in two sections, one on the nutritive value and the other on the essential amino-acid composition of the proteins in the food-stuffs. This is followed by relevant bibliography. In view of the importance of proteins in nutrition, the information given in this book will be of great value not only to the nutrition chemists and the dietetician but also to the average citizen in order to enable him to plan for his daily dietary in a befitting manner.

C. H. CHAKRABARTI.

M. C. NATH.

Patterns of Discovery—An Inquiry into the Conceptual Foundation of Science. By N. R. Hanson. (Cambridge University Press, London N.W. 1), 1959. Pp. 240. Price 30 sh.

The development of the subject of quantum mechanics has had a profound effect on the philosophical thought of the West in recent years. The new conceptual set-up has been variously discussed not merely by physicists but by professional philosophers as well. In this book, *Patterns of Discovery*, Professor Hanson has chosen to discuss some of the philosophical concepts in the light of the new situation in physics. The book is admittedly terse from the point of view of the physicist unaccustomed to philosophical thought. But the careful and the thorough manner in which it has been written, with examples to drive home difficult ideas, makes one take to it.

In the first chapter has been discussed the concept of 'observation'. 'Seeing' is not merely a physical state, a systematic exposure of the

senses to the world, but is an 'experience' involving organisation of what is seen. Also 'seeing this or that' threads knowledge into our seeing and the vital role played by the 'language' employed in this connection cannot be overemphasised. The next chapter dealing with facts, viz., the object of an experience, reminds us that the commonsense view of the facts as 'being or happening out there' is far from being true. It turns out on scrutiny that 'facts' are not picturable, observable entities, and are perhaps somehow 'moulded' by the logical forms of the fact-stating language, perhaps a mould in terms of which the word 'coagulates' in definite ways. The third chapter deals with 'causality', a much discussed topic in modern physics. The causal chain view has come in for criticism and it has been shown that this enquiry is, "theory-loaded" from the beginning. The so-called effects and causes (of which there are as many as the attempted explanations of the effects) are 'connected' only because our theories connect them and form items in an interlocked *pattern* of concepts. In the chapter on theories we are reminded that in his search for an explanation of data, the goal of the physicist is a conceptual *pattern* in terms of which his data will fit intelligibly alongside better known data. The method employed is not the method of deduction (which proves something must be), or the method of induction (which shows that something is actually operative), but the method of retrodution or abduction (*apagoge* of Aristotle) which suggests that something may be. A theory is a cluster of conclusions in search of a premise, a keystone idea from which the data are explicable as a matter of course, and it is built up in 'reverse' retroductively. The classical particle physics and the elementary particle physics, (the basic idea of the latter being "interaction") which occupy the last two chapters are examined against this background.

A careful study of the book would be of help both to the physicist and the professional philosopher. It may be pointed out, however, that many of the ideas advanced here call up to one's mind the profound discussion in Indian philosophy pertaining to topics such as *Pratyaksha* (Perception), *Anubhava* (Experience); *Vishayata* (Objectness), *Karyakarana Bhava* (cause and effect relationship), *Prakriya-rachana* (building up of theories), *Paramanuvada* (Elementary particle theory), etc. Students of physics and philosophy would do well to remember Heisenberg's¹ observation,

viz. "Many of the abstractions that are characteristic of modern theoretical physics are to be found discussed in the philosophy of past centuries and we are compelled by the refinements of experimental art to consider them seriously" and to take to a study of these topics in the manner of the previous generations and estimate modern physical thought in the light of such studies.

D. S. SUBBARAMAIA.

The Coconut Palm—A Monograph. By K. P. V. Menon & K. M. Pandalai. (Published by the Indian Central Coconut Committee), 1957. Pp. 357. Price Rs. 38-00.

The present publication is the outcome of the commendable programme of the Indian Council of Agricultural Research and its Commodity Committees initiated by Dr. M. S. Randhawa, the Vice-President, to bring out a series of critical monographs on the important crops of India. The publication brings together all information available on various aspects of coconut palm including its morphology, anatomy, cytology, physiology, cultural practices and the control of pests and diseases. With the establishment of Coconut Research Stations several years ago at Kasargod and Kayangulam, India has contributed much to our present knowledge of this valuable tree crop, and the excellent publications of Sampson in 1923 and Patel in 1938 had become out of date. The present monograph has not only utilised the information available in these previous publications, but has also brought up-to-date results obtained since then. Although coconut is an important crop of India, it is also grown extensively in other countries like Ceylon, the Philippines, New Guinea, Trinidad and Jamaica. Considerable work is also being done on scientific aspects of coconut in these countries and the present monograph includes the results obtained also in these countries. It can, therefore, be said that the objective to consolidate all available facts pertaining to the coconut in a single publication has been achieved.

The book itself is divided into 18 Chapters dealing with the different investigations that have been in progress. The first four chapters deal with the palm, its original home and its botany. Chapters four, five and seven deal with what is at present understood as varieties, their classification breeding and production of quality material. The chapter on breeding is, however, brief and could have been dealt in greater detail. Perhaps the controversy that exists about the

1. Physical Principles of the Quantum Theory.

application of regular breeding practices to this tree crop has made the authors rather conservative in their outlook. One may not entirely agree with the views expounded by Dr. Harland with regard to breeding of coconut. A critical examination of the available data, both in India and in some other countries where investigations have been in progress, might perhaps show that selection of mother trees as it is advocated and practised has provided profitable results, and it is learnt that such a study undertaken in Ceylon does seem to indicate that selection of individuals for number of nuts and nut-weights can be effective. There is no doubt, however, that the improvement of this tree plant should be taken up seriously and on proper lines.

Chapter five on climate and soil conditions could well have been dealt in the beginning or at least before discussing varieties and breeding.

Information on cultural practices in the field, soil conditions, plantation management, yield, etc., are discussed in the next five chapters. They are fairly exhaustive and provide information of practical value not only to technicians engaged in scientific investigations, but also to actual coconut growers.

The diseases and soil conditions in relation to health and disease are discussed in the subsequent two chapters. Investigations have emphasized how complicated the disease problem is, and how it has to be attacked from a wide angle including the soil, the physiology of the palm and its nutrition, viruses, nematode, etc. The chapter on pests is, however, much more critical and contains valuable information on the chief insect pests and methods that have been developed for their control.

The next three chapters deal respectively with tapping, abnormalities and utilisation of coconut products. Perhaps the chapter on abnormalities could have been treated next to the botany of the palm. The concluding chapter on certain problems in coconut research discusses the present position of our knowledge and indicates where all lucuma exists needing further studies and investigations.

The book contains a large number of good illustrations and coloured plates which add to the attractiveness of the volume and incidentally also to its cost. The objectives of this publication is to bring together technical information for the benefit of investigators and technologists and the Coconut Committee could not have made it any cheaper. Perhaps a sister volume embodying the main practical principles of coconut growing can be written for the use of actual growers.

The authors have been associated with coconut research for nearly two decades and the treatment of the material available could not have been in better hands. The information available all over the world has been well compiled and the only criticism, if it is a criticism at all, can be that the authors could have been a little more critical in assessing the value of information compiled.

K. R.

Books Received

- Jets and Rockets.* By A. Barker, T. R. F. Nonweiler, R. Smelt, 1959. Pp. xiv + 268. Price 35 sh.; *Metal Fatigue.* Edited by J. A. Pope, 1959. Pp. xiv + 381. Price 70 sh.; *Aircraft Electrical Engineering.* Edited by G. G. Wakefield, 1959. Pp. xiv + 349. Price 50 sh. (Chapman & Hall Ltd., London W.C. 2; India: Asia Publishing House Bombay-1).
- Heterocyclic Chemistry, an Introduction.* By A. Albert. (The Athlone Press, 2, Gower Street, London W.C. 1), 1959. Pp. viii + 424. Price 45 sh.
- Plant Diseases, Their Causes and Control.* 2nd Revised Edition. By S. Chowdhury. (Katabistan, Allahabad), 1958. Pp. 106. Price Rs. 3.50.
- Blood Groups—British Medical Bulletin*, Vol. 15, No. 2, May, 1959. (The British Council, London W.1), 1959. Pp. 89-173. Price 20 sh. (Dover Publications, New York-14), 1959.
- Magnetic Sound Recording.* By D. A. Snel. (Philips Tech. Lib., Eindhoven; India: Philips India Ltd., Calcutta-20), 1959. Pp. xii + 217. Price Rs. 12.00.
- The Harvey Lectures, 1957-58.* (Academic Press, New York 3), 1959. Pp. xiv + 254. Price \$ 7.50.
- Methods of Biochemical Analysis.* Vol. 7. Edited by D. Glick. (Interscience Pub., New York-1), 1959. Pp. ix + 353. Price \$ 9.50.
- Electronic Digital Computers.* By C. V. L. Smith (McGraw-Hill Book Co., London E. C. 4), 1959. Pp. ix + 443. Price \$ 12.00.
- Nuclear Magnetic Resonance—Applications to Organic Chemistry.* By John D. Roberts. (McGraw-Hill Book Co., London E.C. 4), 1959. Pp. viii + 118. Price \$ 6.00.
- Principles of Modern Physics.* By Robert B. Leighton. (Mc-Graw-Hill Book Co., London E.C. 4), 1959. Pp. xi + 795. Price \$ 12.50.
- Advanced Calculus.* By Edwin Bidwell Wilson. (Dover Publications, New York-14), 1959. Pp. ix + 566. Price \$ 2.45.