

string and dangled before the toad *Bufo melanostictus*, is greedily snatched at, but thrown out the moment the mistake is discovered. It is well known that movement on the part of animals provokes the curiosity of their enemies with fatal consequences.

Under the auspices of the Asiatic Society of Bengal a symposium on the Early History of Northern Bengal was held on Monday, the 2nd January 1933. The following papers were read and discussed:—

"Note on the Early History of Northern Bengal." By H. E. Stapleton.

"Note on a Mauryan Inscription from Mahasthan." By D. R. Bhandarkar.

"Note on Three Kushan Coins from North Bengal." By N. G. Majumdar.

The Progress of Agricultural Co-operation in Mysore was the subject of a recent address before the Mysore University by Mr. S. Venkatakrishnayya. After drawing attention to the heavy indebtedness of the peasantry, the lecturer cited evidence to show that in co-operation lies the hope of salvation to rural India. The public have not, however, awakened to the reality of the situation and the progress of co-operation is very slow: thus, although Mysore stands fourth in the country with regard to the organization of co-operative institutions, yet hardly 6 per cent of the agricultural population of the State have taken

any interest in the movement. The lecturer then cited instances to show how the Irish Free State, New Zealand and other progressive countries have organized their agriculture and trade on co-operative basis and indicated how similar methods can be introduced into Mysore. He laid particular emphasis on the need for (a) further legislation against usury, (b) creation of land-mortgage banks with facilities for short-term loans, (c) co-operative estate management and sale of produce, and (d) organization of rural education, village improvement and cottage industries.

In the course of an extension lecture delivered at the Lucknow University on 30th November 1932, Mr. C. Maya Das, dealing with "Unemployment and Universities", laid emphasis on the need for educated men and women applying their hands and brains to agriculture and related industries. He adduced evidence to show that there is ample scope for expansion in cattle-breeding and dairying, poultry keeping, sericulture, fishery, lac cultivation, bee-keeping and orcharding. There is also ready money in rice-hulling, oil-crushing, pickling and preserving, while considerable savings can be effected by silaging surplus fodder and converting domestic and farm wastes into manures. The lecturer concluded with exhorting his hearers to organize their efforts, to initiate co-operative ventures, to always aim at superior quality and to strive for rural uplift including hygiene, education and cottage industries.

Reviews.

INDIAN INDIGENOUS DRUGS. By Col. R. N. Chopra. First edition, pages xxii+655. (Calcutta: The Art Press, 1932.) Price Rs. 15.

Col. Chopra's latest book "The Indian Indigenous Drugs" is one of the most readable and useful publications which the reviewer has come across. The book owes its inception to an invitation by the Patna University to the author to give lectures as Sukhraj Ray Reader in Natural Science in 1929-30 on the medical and economic aspects of Indian medicinal plants. Later, as Chairman of the Drugs Enquiry Committee appointed by the Government of India in 1930-31, he came in intimate contact with the professions of medicine and pharmacy during his all-India tour and gathered together a large mass of useful information on the subject. Since the creation of the Calcutta School of Tropical Medicine in 1921, Col. Chopra has been in charge of the teaching and research work in Pharmacology, and has been engaged in the investigation of indigenous drugs. During these investigations he had the collaboration of the Department of Chemistry at the School in the two-fold preliminary work involved, namely, (1) the working out of the

chemical composition of the drugs, and (2) isolation of their active principles. As physician to the Carmichael Hospital for Tropical Diseases, attached to the School, he has had ample facilities to carry out clinical trials with these drugs or their active principles. The book is divided into four parts. The first part deals with the necessity of research in the vast field of indigenous drugs. The term 'indigenous drugs' is used in a very broad sense and has been taken to include not merely those drugs which were originally the natives of India but also the exotics which had become domiciled. The author gives a historical survey of the different attempts at research on indigenous drugs during the last 100 years or so and points out the reasons for their failure to get any definite results. He then discusses the three main lines along which work was undertaken by the combined efforts of the Departments of Chemistry and Pharmacology of the Calcutta School of Tropical Medicine, aided by clinical trials at the Carmichael Hospital for Tropical Diseases. The aim of this work was both scientific and economic and may be summarised as follows:—

(1) To make India self-supporting by enabling her to utilize the drugs produced in the country and by manufacturing them in a form suitable for administration.

(2) To discover remedies from the claims of Ayurvedic, Tibbi and other indigenous sources suitable to be employed by the exponents of Western medicine.

(3) To discover the means of effecting economy so that these remedies might fall within the means of the great masses in India whose economic condition is very low. The desirability of using crude drugs, which are cheap, in place of the refined and finished preparations, is also discussed in this connection. The author makes out a special case for the cultivation of important medicinal plants in this country in view of the fact that India possesses a most wonderful variability so far as temperature and general climatic conditions are concerned. He very pertinently quotes Prof. Greenish of the London School of Pharmacy: "India, owing to the remarkable variations she possesses of climate, altitude and soil, is in a position to produce successfully every variety of medicinal herb required by Europe." It is, therefore, earnestly hoped that the subject will attract the attention of the Imperial Council of Agricultural Research and the Departments of Agriculture and Industries of the different Provincial Governments so that they may assist in prosecuting fundamental research on the subject which may stimulate the agriculturists to grow medicinal plants and the pharmaceutical chemist to manufacture drugs from them. The economic importance of this policy can only be fully appreciated by studying the position of the drug trade in India. The value of imports is estimated at about two crores of rupees per annum and that of exports at about forty lakhs. This adverse trade balance can be explained by the fact that drugs in crude form are exported from India to foreign countries at a nominal price, where they are utilized in various medical and allied industries and a portion of them is returned to India in the form of expensive preparations. A unique opportunity thus exists for the pharmaceutical chemist in this country, which if fully taken advantage of, will go a long way in removing unemployment among the educated classes. It will also bring into existence other allied chemical industries.

The second part of the book deals with

pharmacopœial and allied drugs growing in India. The author has tried, in this section, to bring forward to the readers the enormous potential drug resources of India and the various ways and means by which these resources may be harnessed to the economic benefit of the country. A large number of these drugs grow wild and in great abundance in many parts of India but for want of definite knowledge about their constituents and active principles, these cannot be taken into use by the medical profession. The author has analysed a large number of these drugs himself and has shown that in many cases the Indian varieties are richer in their alkaloidal contents than those imported and can be safely used as a substitute for the more expensive foreign remedies. The readers will get very useful information and valuable suggestions regarding drug growing and drug manufacturing, not easily available elsewhere. The third part deals with the drugs used in the indigenous medicine. In this part a section is devoted to drugs of mineral and animal origin, and deals with makaradhwaja, musk, silajit and snake venoms. The chief object in both these parts of the book is to give a brief botanical description of the plants from which the drug is derived. This is followed by a short account of the chemical composition, the pharmacological action and the therapeutic uses of the drug. This is based mainly on the work done by Col. Chopra and his colleagues in the Departments of Pharmacology and Chemistry but a résumé of practically all recent investigations on these drugs is also given. References for the convenience of the reader for getting further information from original sources are also inserted under each drug.

Part IV of the book deals with Indian *Materia Medica*. It is divided into three sections. Section 1 is a glossary of over 2,000 Indian medicinal plants. It gives the vernacular names, uses, chemical composition and references to any work published regarding them. This seems to be the most complete list of Indian medicinal plants published so far and has clearly cost a great deal of labour to the author. Sections 2 and 3 of this part deal with the inorganic and animal products used in the indigenous medicine.

Besides a comprehensive table of contents and a general index, the book contains an index of vernacular names of indigenous drugs, which is invaluable for purposes of reference.

From what has been said it is clear that this is a very useful book. It has both a scientific and economic interest. It should prove equally useful to the economic botanist and the organic chemist wishing to undertake work on important plant products and the medical man. Its economic interest lies in its usefulness as a guide to the agriculturist in showing him what types of medicinal plants should be grown and to the pharmaceutical chemist in indicating to him the possibility of manufacture of drugs derived from them. The book is well printed and is remarkably free from typographical errors. It is moderately priced.

B. K. S.

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The Vitamins. By Sherman and Smith. ("An American Chemical Society Monograph" issued by the Chemical Catalogue Company, Inc.)

Our knowledge of the vitamins is increasing in such a bewildering manner, that a review of the subject like that which is presented in Sherman and Smith's monograph is eminently welcome. The book gives a well-balanced survey of the different facets of this rapidly developing section of biochemistry. The bibliography, which covers nearly one-third of the entire book, will be very useful to research workers and indicates the colossal amount of labour, that is being devoted to the elucidation of the chemical nature and the physiological function of these dietary factors.

Beginning with an exposition of the origin and development of the vitamin theory, the chapters deal severally and successively with vitamins B₁, B₂, C, A, D and E. The almost romantic stories of the discovery of the precursors of vitamins A and D are related in a lucid manner. The chapters on the B-vitamins give an up-to-date and detailed summary of the present position of the subject. Reference is also made to the recognition of the newer factors, necessary for the nutrition of the rat and the pigeon.

Monographs on vitamins, however, tend to be a little out-of-date almost as soon as they are published. Thus since the publication of this volume, our knowledge of vitamin D has progressed considerably. Vitamin C has been identified apparently beyond doubt as hexuronic acid and in the reviewer's laboratory the production of a vitamin *in vitro* from a known substance has been attempted apparently with success. Nevertheless, monographs of the nature of

Sherman and Smith's volume are very desirable, because they serve to coordinate the scattered data, which are accumulating apace. It is believed the book will be found useful by all those, who consult it.

B. C. G.

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The Mechanics of Deformable Bodies, being Vol. II of "Introduction to Theoretical Physics" by Prof. Max Planck. Translated into English by Prof. Henry L. Brose. (Macmillan & Co., Ltd., London, 1932.) Price 10s. 6d. net.

In these days of rapid advancement in Theoretical Physics it has become increasingly necessary that the serious student of Physics should have in his hands a work which presents the fundamentals of the subject in a consecutive manner and treats it with necessary mathematical rigour. One can unhesitatingly say that among such works Prof. Max Planck's "Introduction to Theoretical Physics" occupies the front rank. "The Mechanics of Deformable Bodies" forms the second volume of this work. The treatment is characterized by the clarity and conciseness which one expects from the eminent Mathematical Physicist. In introducing the subject the author, while drawing attention to the necessity of making simplifying assumptions in dealing with particular groups of problems, makes the pregnant remark that 'Nature does not allow herself to be exhaustively expressed in human thought', the truth of which recent advances in Theoretical and Experimental Physics have made the modern student realize more than ever.

The work is presented in three parts. In Part I the general laws of motion of a continuously extended body are dealt with under the two heads, laws of kinematics and dynamical laws, forming the ground-work for the superstructure built in Parts II and III. In Part II infinitely small deformations receive treatment under the headings: Rigid Bodies, States of Equilibrium of Rigid Bodies, Vibrations of Rigid Bodies and Vibrations in Liquids and Gases. Part III comprises General Remarks, Irrotational Motion, Vortex Motion and Friction. As one reads through the book one finds that the subject develops in a natural way with the fundamental problems coming under each head treated with a clearness and thoroughness hardly to be excelled. While everything is uniformly well done, no portion of the work calls for particular remark; we are,

however, tempted to draw particular attention to the Physical and Physiological aspects of musical intervals, musical scales and the ear as a Fourier analyser, models of clear and concise exposition. While speaking of the ear, the author says "An idea of this power of the organ of hearing, which borders on the miraculous, may be gathered if we reflect that the trained ear of a conductor is able to distinguish in the mass of sound produced by a combined choir and orchestra not only the tones and qualities of the individual instruments, but also the individual letters of the words that are sung. In this respect the ear is infinitely superior to the idea (*sic*. eye). For a colour, white, green or blue, is always experienced as something uniform and we are unable to specify directly whether and how this colour is composed physically of other colours."

The translation is well done. We heartily commend the volume to every earnest student of Physics.

B. V.

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Fertilizers and Food Production. By Sir Frederick Keeble. Pp. ix+196. (Oxford: The University Press, 1932.) Price 5s. net.

A charming volume dealing with the possibilities of intensifying crop-production by judicious application of fertilizers.

After surveying the causes which led to the present depressed condition of agriculture in Great Britain, the author proceeds to discuss the means of increasing home-grown food for the future. Experiments carried out in different parts of the country and particularly those at the Jealott's Hill Farm have shown in a convincing way that increased yields varying from 15-30 per cent. can be obtained by judicious and timely application of fertilizers. Great Britain is

essentially a grassland country and the soil and climatic conditions are such that in most parts of the island far bigger returns can be obtained by intensive grassland farming than by arable farming. Experiments on grazing in intensively managed holdings have shown that a larger number of cattle and sheep can be maintained per unit area together with a considerable saving in the cost of concentrates than in the past. Furthermore, grass can be preserved for winter use by silaging or by special processes of quick drying which yield products that are superior to the present type of stored hay. The efficacy of strip grazing, rotation of crops applicable to grassland and the economics of fertilizing and the returns therefrom are discussed and evidence adduced to show that the farmer always stands to gain by judicious use of fertilizers. The book concludes with schemes for scientific use of fertilizers for different crops and an appendix of recent data supporting the various statements made in the text.

The book is unfortunately one-sided and deals only with the application of mineral fertilizers in British farming. No mention is made of possible extensions of such observations to agriculture in other parts of the world: nor is full justice meted out to organic manures, which in spite of their bulkiness and somewhat tardy availability are more consistent in their action than any combination of artificials that man has so far devised.

The book is written in delightful style and well illustrated with tables and charts. The printing is in excellent type and on good paper and Messrs. Oxford University Press deserve to be congratulated on their performance.

V. S.