
REVIEWS.

Progress of Science in India.—The Progress of Science in India during the past Twenty-Five Years. Edited by B. Prashad. (Published by the Indian Science Congress Association, Calcutta.) Pp. lvi + 767. Price Rs. 5 (Paper Cover) ; Rs. 6 (Bound).

During the last quarter of a century there has been a remarkable progress as regards scientific teaching and research in all parts of India. This period has synchronized with the foundation and growth of the Indian Science Congress, which celebrated its Silver Jubilee in the earlier part of the year. It was therefore a happy thought on the part of the authorities of the Science Congress to have undertaken the task of publishing the volume under review. The volume has been brought out with commendable promptitude under the general editorship of Dr. B. Prashad, Director, Zoological Survey of India. Besides a valuable introductory chapter by the editor, it contains 17 other chapters written by the specialists in their respective fields. The various chapters have been contributed by Dr. W. A. Jenkins (Scientific Education), Principal B. M. Sen (Mathematics), Prof. J. C. Ghosh (Chemistry), Mr. D.N. Wadia (Geology and Geography), Dr. W. Burns (Agriculture), Mr. F. Ware (Veterinary), Mr. Z. L. Kothavalla (Dairy Husbandry), Rao Bahadur K. N. Dikshit (Archæology), Dr. B. S. Guha (Anthropology), Dr. G. Bose (Psychology), Dr. H. Srinivasa Rao (Zoology), Mr. H. G. Champion (Forestry), Mr. W. C. Ash (Engineering), Lieut.-Col. S. L. Bhatia (Physiology), Sir U. N. Brahmachari (Medical), Prof. M. N. Saha (Physics) and Prof. S. P. Agharkar (Botany).

It will be seen from the above that the list of contributors includes some of our leading authorities and their names are a guarantee of the high quality of their work. All the contributors have taken pains to present full and useful summaries of the work done in their respective fields. An examination of the book in detail shows that not only has full justice been done to the high lights in Science, such as Bose, Ray, Ramanujan, Raman, Saha and Sahni, but the work of the humble camp followers has also been

duly noticed. Most of the chapters are provided with useful bibliographies. The book is a mine of useful information relating to the achievements of Indian scientists and is sure to prove a *vade-mecum* to all scientific workers.

The editor and the contributors deserve to be warmly congratulated on their co-operative effort in producing such a highly useful volume.

B. L. B.

The Adrenal Cortex and Intersexuality.

By L. R. Broster, Clifford Allen, H. W. C. Vines, Jocelyn Patterson, Alan W. Greenwood, G. F. Marrian and G. C. Butler. With a Foreword by Sir Water Langdon-Brown. (Chapman and Hall, Ltd., London), 1938. Pp. xii + 245. Price 15s. net.

The book is undoubtedly a solid contribution, extending our knowledge of some of the obscure biological phenomena resulting in distressing manifestations, such as feminine virilism, masculine feminism, absence or disappearance of procreative instincts in either sex, and the failure of development of genital organs to their functional proportion. These vagaries of human nature provide a field for investigation far beyond the compass of a single study, and therefore the problem has been approached from the clinical and surgical, psychological, pathological and biochemical aspects. The whole subject, till the researches of Dr. H. W. C. Vines were made known, was surrounded by speculative controversies, and the demonstration of the presence of a specific substance, strongly fuchsinophil, in the adreno-cortical cells of patients afflicted with virilism, rendered progress along other lines of investigation possible and rapid. Any departure from normal development, apart from the distress caused to the unfortunate victims, must have a far-reaching effect on social problems, and therefore the interest of the book is not confined to the medical profession, but must necessarily extend to the community in general.

The book is divided into two parts. The first part is devoted to the clinical study

of the adreno-genital syndrome under clinical and surgical, and psychological aspects and the second part deals with the scientific study of the adreno-genital syndrome under pathological and biochemical aspects.

The results obtained under each head point to the existence of a chain of physiological links connecting the hypothalamus, pituitary, suprarenal and sex glands, and any departure in the function of any one of the first three structures, produces imbalance of the last and the consequent abnormal manifestations. Normal development and functions must therefore depend upon the maintenance of the balance of physiological power among these co-ordinating endocrine bodies, and hyperplasia or hypersecretion of any one of them leads to distressing alterations of the psychosomatic organisation. These maladies are therefore capable of being terminated by surgical and psychological treatment.

In the case of female virilism Dr. Broster, who has given a complete account of his technique and results of unilateral adrenalectomy, has established that "the surgery of the adrenal gland in virilism coincides with our conceptions of the other glands in the endocrine series, that a hypersecretion of the two glands can be controlled by means of the removal of one, and there is as yet no clinical evidence that the remaining gland hypertrophies sufficiently to cause a return of the condition". The results of operation have been to restore the patients to the normal feminine characters with the return of the capacity for sexual life.

The phenomenon of intersexuality has a profound biological significance. The determination of sex is only a pattern of chromosomal endowment, on which the pituitro-adrenal mechanism has a direct control. The physical side of the individual sexuality is as complicated as the psychical side, because the seat of emotions—hypothalamus—is closely connected with one of the most important glands—the pituitary body. Dr. Allen who has investigated cases of perversions which form the body of adreno-genital syndrome, and who has pursued a new line of enquiry, has achieved important results by showing the close relationship of the psychic element with physical abnormality. Dr. Broster's patients have been psychologically studied by Dr. Allen and the table and description of cases (pp. 74-131) show the dependence of sexuality on endocrine

and psychic factors—glandular dysfunction producing mental maldevelopment.

Perhaps Dr. Vines's histological investigation of the adrenal cortical tissue (an account of the Ponceau-Fuchsin Stain method adopted by him found on pp. 139-40) of all the cases of virilism, has given us a rare insight into the ætiology of aberrations. The results of pathological investigations have led to the enunciation of the general principle "that the occurrence during the early foetal life of the female of a short period of androgenic and heterosexual development of cortical origin introduces an element of instability which is rare in the male. Further study led to the suggestion that in normal development, the adrenal cortex plays the part of bisexual accessory sex gland which is active throughout life, and that it secretes both androgenic and oestrogenic hormones under the control of the pituitary". Perhaps the next step in the investigation will be to incriminate the sympathetic system in the production of the abnormal sexual variations of the kind of intersexuality. The biochemical investigations of Dr. Patterson and Professor Marrian have shown the occurrence of 'free' and 'bound' male hormone in the urine of the patients, and to the isolation of a new substance, peregane 3-17-20 triol ($C_{21}H_{36}O_3$) from the urine of typical virilism cases.

The book is profoundly interesting and important. Its chief merit lies in opening up new fields of investigation in a branch of knowledge, to which the contributions of the authors will always remain permanent and inspiring.

Season of Birth, its Relation to Human Abilities. By Ellsworth Huntington. (John Wiley & Sons, New York; Chapman & Hall, Ltd., London), 1938. Pp. vii + 473. Price 17/6.

The book attempts to establish the foundations of a new branch of science, "Climatological Basis of Human Progress" and for this purpose the author, who has done considerable investigation in statistics, assures the readers that he has discovered a new theory of far-reaching importance. The statistics reveal a close relationship of birth and climate, and it is possible for climatic conditions to influence the path of human progress. It is pointed out that the human species during the ice age

acquired a mechanism of adjustment to climatic changes and this mechanism having a survival value must have determined the reproductive periods. The author deduces from his researches that the sexual rhythm coincides with what he calls the physical and mental optimum temperatures, the former favouring conception and the latter promoting the health and longevity of the new-born infants. Attempts to establish favourable months for the birth of geniuses (January, February or March) from an exhaustive study of their dates of birth, have also shown that during these months an equal number of idiots and imbeciles were born. The study of school children in America shows that children born in September and October have a comparatively higher I.Q. than those born at other seasons, the I.Q. being lowest in the case of those born in January and February. According to the author who has gathered his statistics from American archives, the physical optimum temperature is the average of 60° to 65° F. and the mental optimum temperature is the average of 39° to 54° F. Having established these two mean temperatures, he proceeds to elaborate his thesis that it is the most favourable temperature to promote the general metabolic activity and glandular function. It is noted that the brain does not function as well as other organs at certain temperatures and the optimum of the latter may not be the optimum of the former. The author has an explanation for this apparent anomaly.

In the case of lower animals the periods of vegetative and reproductive functions follow a cycle which closely synchronises with the seasonal cycle. These periods depend upon the presence and abundance of food, freedom from enemies, the reaction of the nutritive phase on the liberation of sex hormones and the emotional impulses leading to sex congregation. Perhaps the subhuman races and primitive man of the glacial epoch must have been subject to the laws which still govern the vegetative and reproductive phases of animals, but how far is the modern American gentleman removed from his remote ancestor,—in the matter of food, dress, tastes, habits, and the progress of this gentleman has been rendered possible by his success in the efforts to control his natural environment. He is at present engaged in creating artificial climates, so as to secure comfort and health,

independently of the natural cycles. Man's conquest over nature has been a triumph of his mind. Assuming that temperature has a profound influence on glandular activity and that there are definite seasons for conception and birth in human society, it must be remembered that the temperature conditions (including humidity and sun light) which governed the metabolism and reproduction of primitive man are totally different from those prevailing in a Modern City like New York or London. What is the effect of the presence of dust, odours and poisonous gases on the temperature of the air? What about the great irrigation projects and the policy of deforestation?

Apart from all this, we know that conception in the case of animals follows the onset of menstruation,—a phenomenon which has definite periods, separated by long intervals. These intervals among men are abridged to less than a month and recurrence of such periods involves the natural consequences. In the animals the coincidence of the appearance of heat with a particular season, would seem accidental and in man the periods occur normally throughout the year. If the greatest number of births should occur in particular months, can it be supposed that the optimum physical and mental temperatures have determined the number or that seasons exercise some mysterious effect on the birth of geniuses and idiots? Is it supposed that a certain season favours the fusion of germinal cells more effectively than another when germinal cells are available throughout the year for impregnation?

We are not disposed to question or minimise the influence of climatic conditions on human birth rate, but we should imagine that these conditions alone cannot offer a satisfactory explanation of phenomena such as the greatest number of births in particular months or the appearance of the largest number of eminent men or mental deficiencies in certain seasons. They depend upon other biological factors for the optima of one nation may not be the optima of another and the physical and mental optimum temperatures of the author cannot have universal validity. The influence of climate on the reproductive activities of animals is exerted indirectly through the production of proper and adequate food supply and as civilisation progresses, the

share that temperature had in shaping the procreative phase of primitive man must necessarily diminish.

We may not agree with all the arguments of the author in supporting his theory which is certainly entitled to respect. The author does not entirely depend upon statistics for its formulation. We have no doubt that the book will be widely read. Its doctrine is stimulating and novel, perhaps daring in its originality, but throughout the author conforms to the logical method of developing his propositions. When researches on these lines are undertaken in other countries, perhaps the theory of optimum temperatures in relation to births may become a scientific generalization.

Physics in Industry: Magnetism. (London: The Institute of Physics. Published by the Physical Society, London), 1938. Pp. 102. Price 4*sh.* 10*d.*

During the past several summers, the Manchester and District Branch of the Institute of Physics has been arranging conferences on important problems involving application of physics in industry. A branch of physics in which rapid progress has been made is usually chosen and a series of talks is arranged from those well qualified to speak with authority. An account is given in this book of the conference on 'Magnetism,' held in July last year in Manchester.

As Prof. W. L. Bragg aptly remarks in his Foreword, magnetism is a particularly suitable subject for discussion. The interests aroused by this subject are extensive and offer a close link between the universities on one side and industry on the other.

The book contains the summaries of six principal lectures delivered during the Conference. In the first lecture, Prof. Mott deals with the electron theory of magnetism. A brief qualitative explanation of the Brillouin zone theory is offered and the conditions for ferromagnetism are deduced. The next lecture by Mr. Richer of Messrs. John Lysaght, Ltd., Newport, deals with the difficulties in the attainment of magnetic saturation with electrical sheet steel. The hysteresis losses in silicon steel due to the presence of small quantities of carbon and sulphur and also due to eddy currents and grain boundaries are outlined and the possibility of further improvements in the magnetic performance of electrical sheet material is considered. Dr. Dannatt of the Metro-

politan Vickers Electrical Co., Ltd., presents in the third lecture, a clear and concise account of the influence of magnetic materials on the design of power plant. In the fourth lecture, Dr. Stoner summarizes the main characteristics of the magnetization curves of ferromagnetic materials. Mr. Oliver of the Permanent Magnet Association, Sheffield, gives in the next lecture a summary of recent work on permanent magnets which are in such great demand to-day in the radio industry and in the construction of electrical measuring instruments. In the last lecture, Dr. Bradley and Dr. Taylor deal with the relation between atomic arrangement and magnetic properties. X-Ray studies on Prof. Mishima's new alloy Fe₂NiAl show that its remarkable magnetic properties are obtained only when the molten alloy is cooled at such a rate that the iron atoms are held apart from joining together to form islands.

On perusing the book, one cannot help recording a feeling of admiration towards the Japanese investigators working under the inspiration and guidance of Prof. Honda for their extensive and valuable research on the ferromagnetism of metals.

Great credit is due to Dr. Sykes for the able manner in which he has edited the series.

S. R. R.

Spectroscopy in Science and Industry.

Proceedings of the Fifth Summer Conference on Spectroscopy and its Applications. (Chapman & Hall, Ltd., London), 1938. Pp. vii + 134. Price 1 *sh.*

The publication under review is a compilation of twenty-nine papers that have been presented before the conference on Spectroscopy and its Applications, held during July 1937 at the Massachusetts Institute of Technology. Some of the papers are followed by abstracts of discussions. The papers deal with applications of spectroscopy to a variety of subjects such as experimental technique; analysis of samples of iron, steel, caustic liquors, skin, urine, pigments and gland secretions; structure determinations; rates of reaction; equilibrium in gaseous systems, light sensitivity in seeds and plants, etc. Ten of these papers are mainly concerned with the problems relating to the technique to be adopted and the accessories required in a laboratory of applied spectroscopy. Four papers are devoted to the analysis of samples of iron and steel. Most

of the other papers deal with the possibilities of utilising spectroscopic methods as tools for solving some biological and physiological problems.

S. BHAGAVANTAM.

Outlines of Methods of Chemical Analysis. By G. E. F. Lundell and James Irwin Hoffman. (John Wiley & Sons, Inc. New York, Chapman & Hall, Ltd., London), 1938. Pp. xi+250. Price 15*sh.*

This book is intended to be a companion volume to Hillebrand and Lundell's well-known treatise *Applied Inorganic Analysis*. The authors have endeavoured to present systematic methods of chemical separations and analysis rather than the determinations of elements when they occur alone.

The first part consists of three chapters dealing with the occurrence of elements and their classification. Adequate reference is also made to the composition of the well-known minerals and also of the ceramic, ferrous and non-ferrous materials.

The second part covers all the important methods for separating the elements. In the reviewer's opinion, this is the most valuable portion of the book as it presents at a glance all the facts in a most impressive manner.

The third part deals with methods for determining the elements which include the usual gravimetric methods employing inorganic and organic reagents as well as volumetric methods based on (1) acidimetry and alkalimetry, (2) oxidation and reduction, (3) iodimetry and iodometry. Potentiometry, electrolytic methods, colorimetry and spectrochemical methods are also briefly described.

The fourth part presents diagrammatic outlines of methods of analysis of commercial materials such as limestone, feldspar, bauxite, steel, brass, bronze, etc.

The fifth and the last part deals with the evaluation of the accuracy and precision of the results obtained during analysis.

This book is a very valuable addition to the existing text-books on analytical chemistry and it can be most heartily recommended to every one interested in the subject.

K. R. K.

Direct and Alternating Current Potentiometer Measurements. By D. C. Gall, (Messrs. Chapman & Hall, Ltd., London), 1938. Pp. xiv + 231. Price 15*sh.* net.

This book forms the fourth volume of a series of monographs on Electrical Engineering edited by H. P. Young. There is a Foreword by S. P. Smith.

The first five chapters are devoted to the description and use of the D.C. potentiometer. The sixth chapter deals with the polar types of A.C. potentiometer and the seventh with the co-ordinate type of A.C. potentiometer devised by the author. A description is given of the circuit and its components and the methods of standardisation and phase splitting. Methods of setting up and using the instrument are described together with precautions to be taken. The effects of harmonics, stray magnetic fields and variation of frequency are mentioned. The next four chapters deal with the uses of the A.C. potentiometer. Calibration of ammeters, voltmeters and wattmeters is dealt with. Description is given of the methods of measuring iron-losses, mutual impedance, ratio and phase angle errors of current and potential transformers and the distribution of potential in geophysical prospecting. The twelfth chapter deals with the factors governing the choice of a potentiometer circuit. Effects of leakage, stray capacitance and magnetic fields are discussed and methods of eliminating these effects are suggested. The next chapter deals with the representation of alternating currents by complex quantities and the book ends with a historical note on potentiometers.

The book is immensely useful to those engaged on potentiometry. Difficulties encountered in using the A.C. potentiometer are well brought out, possible sources of error are mentioned and methods of eliminating these are indicated.

B. J. B.

Colloid Chemistry—Principles and Applications. By Jerome Alexander. (Chapman & Hall, Ltd., London), 1937. Fourth Edition. Pp. xviii + 505. Price 22/-.

The book under review is the enlarged edition of the author's well-known book that appeared nearly a decade ago. Its well-merited popularity is as much due to the able manner in which the subject-matter is presented as to the wide range of subjects it envisages. Every student of chemistry

knows that the ramifications of colloid chemistry are wide but even the most versatile among them has to study the pages of Alexander's *Colloid Chemistry*, to ascertain for himself how wide they are.

The first 8 chapters deal with the general principles of colloid chemistry and include classification, preparation and properties of colloids. Under practical applications, covering some 8 chapters and 140 pages, the author has dealt with a variety of subjects including chemical warfare and confectionary and the eminently readable manner in which the facts are presented makes the book at once interesting and valuable. Chapters 17-23 deal with the rôle of colloids in biology and medicine. The presentation of the subject in these chapters is even more fascinating. The chapter on Genetics (Chapter 19) will do credit to any text-book on the subject. One hardly realises that he is reading a book on colloids until the question of factors influencing development is taken up for discussion !!

Books of this type are rare and for the general reader, the book presents a wealth of information which he can gather without much exertion. The study provides a liberal education and the book is recommended to the University student who is generally text-book minded and often is prone to overlook the fact that mental barriers arising from scientific specialisation, are only artificial. The book is particularly recommended to teachers who will find in it a logical presentation of experimental facts. Adequate emphasis is laid on the application of the principles of colloid chemistry in the fields of pure science and technology.

The Travancore Tribes and Castes, Vol. I.

By L. A. Krishna Iyer, M.A. (Government Press, Trivandrum), 1937. Pp. xxi + 277. Price Rs. 7.

This book contains survey accounts of seven of the backward tribes or communities of Travancore State. They are the Kanikkar, Malankuravan, Malapantaram, Malapulayan, Malayarayan, Malavedan and Mannan. The prefix, *Mala* (hill), is found in the names of five of the tribes, but why it does not occur with the names of the other two seems to be an intriguing question. In dress and in speech some of the tribes appear to be of Tamil extraction, and this inference is supported by their tribal myths and traditions, but as in other regions of

the Ghat area, there is here also the superimposition of Kerala culture on the simpler culture of the tribes proceeding at a rapid pace along with the economic penetration of the people of the low country into the territory of the "kings of the forest". How the less differentiated tribal culture reacts to the newly introduced influences is, of course, the chief point of theoretical as well as practical importance in this study. On the administrative side, the tribes present a difficult problem but the author has made it clear that uncontrolled changes and contacts with 'civilization' are not in the interests of the Travancore tribes as of other backward communities in other parts of the world. It is however gratifying to learn that many of the tribes are increasing in numbers and are getting Hinduised. Dr. J. H. Cousins who contributes a preface hopes that these tribes will also benefit, at least psychologically if not in a more direct manner, by the temple entry proclamation of H. H. the Maharaja of Travancore.

The author has presented his data at the observational level in the manner of the ethnographic survey volumes published for the British Indian provinces over three decades ago. The ethnographic material published in this volume will provide the basis for detailed analytical studies of the tribes, which, we hope, the author will undertake.

A. AIYAPPAN.

Le Nutrition, Parts iii, iv, v, vi and vii.

(Actualites Scientifiques et Industrielles. Nos. 557-561, Herman et Cie, Paris.)

- (1) *Le Soja et Son Role Alimentaire.* By Jean Bordas. Pp. 32. Price 8 fr.
- (2) *L'Utilisation Alimentaire de La Cellulose.* By M. Mangold. Pp. 38. Price 8 fr.
- (3) *Le Probleme du Pain—Les methodes d'Appreciation de la Valeur Boulangerie Des Farines et des Bles.* By Raymond Guillemet. Pp. 60. Price 12 fr.
- (4) *Le Probleme du Pain—La Fermentation Panaire.* By Raymond Guillemet. Pp. 100. Price 20 fr.
- (5) *La Consideration du Poids Vif Dans Les Etudes d'Alimentation.* By Raoul Gouin. Pp. 23. Price 7 fr.

Of these short monographs on subjects connected with nutrition the one on the soya bean will be of most interest to Indian

workers. The author gives full chemical analysis of many varieties and discusses the ways in which the pulse may be used as a food for both men and animals. The total production in various countries of the world is given. It is pointed out that the soya-bean is not cultivated widely either in France or in the French Colonies, and it is suggested that its extended use should be considered by all local Agricultural Research Stations.

R. P.

An Introduction to Geology. By A. E. Trueman, D.Sc., F.G.S. (Thomas Murby & Co., London), 1938. Pp. xvi + 258. Price 4s. net.

A Committee of the British Association recently discussed the place of Geology in a scheme of education for the young, and the claims of the subject for being included in all school courses either as an independent subject, or as part of a scheme of instruction in 'General Science', or in connection with courses in Geography, have been eloquently and convincingly set forth in their Reports. Accordingly quite a number of schools in England have already introduced Geology in their courses, and there is no doubt that many more will soon follow. We hope it will not be long before the educational authorities in India will also adopt the recommendation of the British Association Committee and give Geology its proper place in our scheme of scientific education; for "involving as it does long excursions into space and time, Geology is a subject peculiarly fitted to stimulate scientific imagination, which is the very essence of the highest education".

The present *Introduction to Geology*, by Prof. A. E. Trueman, has been prepared on the lines approved by the British Association Committee, and is intended for the young High School student who is just beginning to learn Geology. In the course of about 250 pages, the book deals in an elementary way with the whole range of the subject. The illustrations are mostly diagrammatic; but considering that the book is meant for the young student who is just being introduced to the subject, this is certainly an advantage, since such diagrams can be made to illustrate very clearly the geological phenomena, which it is intended the young reader should properly understand. The treatment of the subject-matter

is throughout exceedingly clear and lucid, and the suggestions for Practical Work given at the end of each chapter form a very valuable feature of the book, and will greatly assist the teacher in making the subject more interesting and popular. On the whole, the book serves to give an excellent 'introduction' to Geology, not only to the young student who may later proceed to specialise in the subject, but also to the general reader who desires to know the scope and methods of Geology, as a science.

L. RAMA RAO.

Biology for Senior Schools—Book I. By M. R. Lambert. (Macmillan & Co., Ltd., London), 1937. Pp. 158. Price Re. 1-10-0 or 2sh. 9d.

With the realisation of the fact that the essentials of Biology form an integral part of the training of every child, a large number of books have come to be written for the use and guidance of children. The book under review intended for an eleven-year old child is the first of a series of three and the portions included in it are expected to be covered in a year. A refreshingly novel method of introducing the subject is used, the child being asked in the first few pages to make the acquaintance of a familiar plant and an animal. The examples chosen, the dog and the butter cup are essentially those with which the English child is more familiar and the author, instead of plunging directly into technical lore regarding the differences between plants and animals in the first chapter of the book as is common in most books on Biology, gently takes the child through everything that a plant or an animal does and finally reveals to the eager mind the important characters of the two groups of living beings. This essential fact of good teaching—from the familiar to the unfamiliar—is seen throughout the book and is the outcome of the experience of an actual teacher, which the author is. The introduction of a few simple but highly convincing experiments help to sustain the interest of the child throughout. The examples of the plants and animals chosen are such as to make the book useful to English children and it leaves behind a desire for a similar book for use in Indian schools.

B. R. S.