Reviews.

MODERN SURVEYING FOR CIVIL ENGINEERS. By Harold Frank Birchal, O.B.E., D.F.C., ETC. (Chapman & Hall, Ltd., London). Pp. 524. Price 25*s*.

This book on surveying for Civil Engineers is the outcome of the author's experience in engineering surveys and is written with the purpose of placing in the hands of the engineer—specially the younger practitioner of the profession—a volume to enable him to get an insight into the practical side of surveying—that most valuable part of an engineer's work generally inadequately or not at all treated in most text-books.

The author presents the fundamental principles of surveying in a simple and clear style, eschewing almost rigorously all that he considers extraneous and superfluous matter. His treatment, though concise, is comprehensive and the great merit of the book consists in the lucid exposition of the methods of surveying as actually employed in connection with the several engineering projects. The young engineer, when faced with a problem, is sure to find a guidance in the pages of this book where detailed accounts of procedure adopted in solving similar problems encountered elsewhere in the past, are succinctly and lucidly given. The methods of estimating the cost of conducting surveys and determining the requirements under each head are other special features of this book.

The first eight chapters deal with the measurement of distances, accurate base line measurements for bridge location, methods of levelling, different types of levelling instruments, angular measurements by compass and theodolite, detailed descriptions of improved types of theodolites such as the micrometer and the *Wild* and *Tavistock* theodolites and Tacheometry including a discussion on the relative merits of the Jeffcott's Beaman's, Watts Szepessy and Boss-Hardt *Zeiss* Reduction Tacheometers. The next three chapters deal with the methods of cross sectioning, contouring, traversing and descriptions of the plane-table and the range-finder and methods of using them. The succeeding six chapters are mainly devoted to the methods adopted in connection with irrigation, pipe-line, water-supply, road and railway project-surveys including tidal-flow surveys for sewage disposal and tunnel-surveying. There is a chapter on circular and transition curves and another on railway Points and Crossings. The last two chapters deal with photographic and aerial surveying, just to give the reader the bare elements involved in such surveys and enable him to appreciate their applicability in specific cases, and localities, in preference to the ordinary ground methods.

The book is well-written and a large amount of new material, specially regarding recent improvements in surveying instruments, not to be found in many of the existing text-books, is included. Particular attention is called at all stages to the accuracy attainable in the different methods of surveying and the need for and methods of saving the needless labour and time generally spent on the attainment of the highest possible accuracy, whether necessary or not. The author's close association with surveying schemes is undoubtedly responsible for the many practical tips and the short and direct methods of approach to problems, that the book abounds in. There are numerous well-drawn diagrams besides several photographs of representative modern surveying instruments which will help the reader to follow the text with ease.

The aim of the author to place in the hands of the engineer a handbook of practical surveying, which will be of real help in solving field problems, is amply achieved and the book will be a very desirable addition to the reference library of an engineer.

D. SUBBA RAO.

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CELLULAR RESPIRATION. By Norman U. Meldrum. (Mathuen's monographs on biological subjects) 1933. Pp. xi+116. Mathuen & Co., Ltd., London. Price 3 *sh*. 6 *d*.

The book prepared by the late Dr. Meldrum sets forth in a simple manner and in a short compass the salient features of cellular respiration the literature on which is highly confusing, particularly for the beginner. The subject by itself forms a very important branch of biochemistry; in recent years, its importance has increased, as its ramifications have extended beyond simple 'respiration'. Thus oxidations and reductions play an important rôle in the activation of proteases; glutathione appears to function as a co-enzyme for glyoxalase, and is thus connected with carbohydrate metabolism.

Dr. Meldrum's treatment is logical and is easily understandable by the beginner. The

method of the book represents what may be described as "loud thinking". Its brevity has no doubt restricted its scope. The inclusion of a few essential experimental details would have greatly enhanced the value of the book; the 3-page appendix hardly serves the purpose. A few aspects of the subject could have been elaborated with advantage. Thus the close relationship and perhaps identity between the "Atmungs ferment" and "Indophenol oxidase" should have been emphasised. In the chapter on dehydrogenases, the products of oxidation of the metabolites could have been fully described. The chemical configuration of methylene blue has been needlessly repeated and in other respects too, such as in the arrangement of matter, the book is capable of improvement. There is no doubt, however, that the book forms an excellent introduction to the subject and even for the student requiring access to original literature a very useful list of selected references is given at the end of each chapter.

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HANDBOOK OF CHEMISTRY. Compiled and Edited by N. A. Lange. (Handbook Publishers, Inc. Sandusky, Ohio,) 1934. Pp. 1265 + 249 + 29. Price $6·00.

This handbook compiled and edited by Dr. Lange will be welcomed by all chemists who require a reference volume containing "Chemical and physical data used in laboratory work and manufacturing." The list of contents comprise nearly 160 different sections compiled with specific attention to their utility for those interested in Chemistry and allied sciences. The comprehensive nature of the different sections can be appreciated when it is mentioned that under "Physical constants of organic compounds" there are 4452 entries with their Beilstein references. There can be little hesitation in saying that this book will prove indispensable to every worker having difficult access to a technical library.

The volume will find a place on the desk rather than on the book-shelf, as there is little doubt that the Chemist will find need to turn to its pages for frequent reference. By reason of the fact that the Editor has obtained valuable assistance and co-operation of a very large number of competent chemists in his arduous task, the handbook bears the stamp of an authoritative and reliable document. The get-up of the book with its flexible binding leaves nothing to be desired.

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STUDIES IN THE PHYSIOLOGY OF THE EYE. By J. G. Byrne. (Messrs. H. K. Lewis & Co.) Pp. 428. Price 40s.

"The title is somewhat misleading as the book is entirely devoted to certain limited aspects of ocular physiology and does not attempt to traverse the whole field of the subject usually termed "Physiology of the Eye". If the extent covered is small, the thoroughness with which the studies are made more than compensate what might appear at first a narrow field. Every chapter in the book bears ample evidence of numerous very careful and scientifically controlled Laboratory animal experiments from which conclusions have been drawn. The book is a valuable example of what good scientific reliable Laboratory work should be; for every batch of experiments are given the main purpose, the methods employed, experiments made, observations noted and conclusions drawn. Apparent discrepancies are not ignored but critically examined and where possible fully explained.

The book is divided into four parts. The first part deals with paradoxical pupillary phenomena following lesions of the affarent nerve paths. The author concludes that various somatic lesions and various visceral lesions produce an inequality of the pupils which fact considered in conjunction with somatic pain direct or referred will be of great value in diagnosis of disease and in medicolegal work. Part II deals with "Preliminary palpebral widening" with light stimulus and paradoxical palpebral and lens phenomena. Part III gives the results of stimulation of the sciatic nerve, the cervical sympathetic and VI cranial nerves and the observations made regarding palpebral widening or narrowing, proptosis or retraction of eye-ball and allied phenomena. Part IV deals with pupil constrictortonus and the mechanism of sleep, hibernation, Narcosis, Coma and related conditions. The rôle of the pupil constrictortonus in such pathological states as Argyll-Robertson pupil, anisocoria and miosis is dealt with. There is a critical discussion regarding the causation and the essential ingredients of the phenomenon of sleep in man and higher animals and conditions analogous to sleep in many lower animals as fish, frogs, reptiles and insects.

There is much that is rather unorthodox and thought-provoking in most of the chapters each of which has a rich Bibliography. The whole book is well illustrated and

provided with a good index. The work is of great value to Physiologists and Neurologists.

B. K. N.

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STRUCTURAL GEOLOGY—WITH SPECIAL REFERENCE TO ECONOMIC DEPOSITS. By Bohuslav Stoces and Charles Henry White. (Macmillan & Co., 1935). Price 25*s*. net.

This book is an elaboration of the work by Dr. Stoces on this subject (which has already been published in Czech and German) in collaboration with Mr. C. H. White, former Professor of Mining and Metallurgy at Harward University and now a consulting mining geologist with considerable experience in many parts of the United States and in several European countries. The book is primarily intended to meet the requirements of economic geologists and mining engineers engaged in the exploitation of mineral deposits. Being thus essentially a text-book of applied geology, special emphasis is naturally laid only on such aspects of structural geology as are necessary for those engaged in the successful exploitation and development of ore bodies. The first part of the book deals with the primary structures of rocks, both igneous and sedimentary, as distinguished from the induced or secondary structures in these rocks due to orogenic movements in the earth's crust, which have been elaborately described in the second part. At the end of each section a convenient summary of all the important conclusions has been given, often regularly tabulated, as for instance, in describing the damaging and beneficial effects of Faulting (pp. 246–260). Towards the end of the book there is just a small chapter of about 16 pages dealing with geophysical methods of prospecting, with special reference to those methods which have been successfully employed in recent years, based on such considerations as magnetism, gravity, rock elasticity, electrical conductivity, radioactivity, etc. The book is profusely illustrated with diagrams, sections and photographs (in fact, these make up nearly half the volume of the book) mostly taken from such standard works of continental authors as Schaffer's *Allgemeine Geologie*, Weinschenck's *Allgemeine Petrographie*, Rinne's *Gesteinskunde*, Heim's *Geologie der Schweiz*, etc.

There are just a few points, however, on which one feels inclined to comment after perusing the book. In some places, as for instance in the very first chapter on the Primary Structure and Arrangement of Sedimentary Rocks, the treatment of the subject-matter seems to be rather digressive; and although nothing has been said which is not useful, one feels that there is a certain amount of "rambling". The chapters on Joints and Veins might, probably with great advantage, have come before those on Folding and Faulting. This arrangement would also have secured the necessary continuity in thought between the chapters on Folding and Faulting and the next one on the "Principal Types of Structures in Folded and Faulted Regions". In dealing with the "nomenclature of faulting" (p. 180) the author says: "Since no system thus far proposed has had general acceptance we have, for the sake of simplicity and clearness, endeavoured to define precisely those terms in the use of which there has been lack of agreement." On going through the next few pages, we are not sure if the authors have succeeded in this endeavour to combine the three great virtues of simplicity, clearness and precision, in their own definitions.

Most of these points raised for comment and criticism may perhaps be considered as merely matters of opinion. Probably they are. In any case they do not seriously affect the value of the book which will be read with great profit by all those technical men who are interested in the development and exploitation of useful mineral deposits.

L. RAMA RAU.

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ACTUALITES SCIENTIFIQUES ET INDUSTRIELLES. No. 199. RADIOACTIVITE ARTIFICIELLE. By F. Joliot and Irène Curie. Paris, Hermann et Cie. 1935. Price 10 fr.

This monograph on the new and fast-developing field of "Artificial Radioactivity" by the original discoverers of new and artificially produced radioactive elements is a most opportune and authoritative exposition of the results so far obtained in this rich province of research. A full account of the fundamental experiments of the authors is given and then a brief discussion of the results of other observers. One could have wished for a more complete account of the results obtained by Fermi and his collaborators. Though the authors have been compelled to add a footnote that Fermi's claim concerning the production of elements beyond Uranium is disputed, the more recent work of Meitner seems to testify to the actuality of the production of elements 93 and 94. The

monograph hints at the immense possibilities that may materialise by the use of the artificially produced radio-elements in therapy and biological research. As a precursor in such a promising field, the present work will meet with a warm reception from all quarters. We must congratulate the Publishers on securing such timely and authoritative expositions of the most up-to-date results of modern research.

T. S. S.

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LE MOMENT ELECTRIQUE EN CHIMIE ET EN PHYSIQUE. GENERALITES ET METHODES. By J. Errera. (Hermann et Cie, Paris, 1935). Pp. 46. 14 Fr.

LE MOMENT ELECTRIQUE EN CHIMIE ET EN PHYSIQUE. MOMENT ELECTRIQUE ET STRUCTURE MOLECULAIRE. By J. Errera. (Hermann et Cie, Paris, 1935). Pp. 59. 15 Fr.

In these two monographs in the *Actualités Scientifiques et Industrielles* series the author has presented an extremely lucid and concise account of the present state of knowledge on the subject of dipole moments in chemistry and in physics. The first monograph is divided into three chapters, dealing respectively with a general account of polarisation and dispersion, methods of determining electric moments, and the theory of atomic bindings. This last chapter on homopolar and heteropolar bonds, valency angles, mobility of bonds and quantum resonance will be found to be particularly illuminating for many chemists not usually acquainted with the recent theories of molecular physics. The second monograph gives a neatly classified account of the informations gained regarding the structure of molecules, both organic and inorganic, from a study of their dipole moments.

The exposition is throughout supported by bold diagrams, clear tables, and a number of references to original papers. There is but one misprint, an obvious interchange between the moment values for nitro and nitroso benzene in table 8A, p. 17 of the second volume. In the midst of a number of books and monographs recently published on the subject of dipole moments, we have no hesitation in saying that these two *exposes* will be found useful both by physicists and by chemists.

M. A. G.

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DIFFRACTION DES RAYOUS CATHODIQUES PAR. By G. P. Thomson. (Hermann et Cie, Paris.)

This monograph is published as a part of *Actualités Scientifiques et Industrielles* in the section on theoretical physics under the direction of M. Louis de Broglie. It consists of translations in French of the first three papers on Electron Diffraction by G. P. Thomson published in the *Proceedings of the Royal Society*. The pioneer investigations dealt with in these papers are of historic value. They were the first experiments that were performed to demonstrate the wave nature of the electron. The diffraction of electrons now offers a powerful tool for the study of surface structure, the structure of free molecules and other topics. The above monograph on the pioneer investigations in these lines will be welcomed by workers in this field.

S. R.

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RECHERCHES SUR LES COMBINAISONS ENTRE LES SELS DE CALCIUM ET LES ALUMINATES DE CALCIUM. By J. Foret. (*Actualités Scientifiques et Industrielles*, 1935.)

The first 12 pages of this paper are devoted to a historical account of the subject and bring under review the existing knowledge about the various aluminates of calcium including those which contain sulfo and chloro groups.

The original investigations described in this paper establish the formation of two types of aluminates having the formulæ (I) and (II), when tricalcium aluminate reacts with soluble salts of calcium.

I. $3\,CaO.\,Al_2O_3.\,(A)_2Ca.\,10\,H_2O.$

II. $3\,CaO.\,Al_2O_3.\,3(A)_2Ca.\,30\,H_2O.$,

where A represents Cl, Br, I, (NO_3), or (NO_2).

The characteristics of these compounds were studied with a microscope as well as by X-ray methods.

Adequate evidence is given to prove that tetracalcium aluminate is hexagonal, whereas tricalcium aluminate is cubic in structure.

The paper includes 4 excellent plates which show the Debye–Scherer diagrams and microphotographs of some of the compounds investigated.

K. R. K.

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HOST PLANT INDEX OF INDO-CEYLONESE COCCIDÆ. By S. Ramachandran and T. V. Ramakrishna Ayyar. (*Misc. Bull.* No. 4, Imp. Council Agr. Res., Delhi, 1934.) Price Rs. 1–10–0.

Its modest price and clear printing would give this publication a wide circulation both in India and outside it; but it is not comparable in quality with similar publications

in Europe and in America. The compilers show a lack of first-hand information with the insects mentioned and have not exhausted all the literature available. The names of plants are further arranged, at the end, in an alphabetical order while a similar index giving the names of insects would have been even more useful. In its absence it took us some time to realise that no new insect has been named by the compilers from Coimbatore nor by any worker from Pusa or Ranchi, three Indian centres, where so much work has been done on scale insects. The student of ecology would regret to find many plants not specifically mentioned and as such these items serve as mere decorations. For example, on the first page *Tachardina lobata* is mentioned attacking *Michelia champaca* and again another *Michelia* sp. which is highly improbable. At least the mistake regarding *Laccifer lacca* which is said to attack a *Schleichera* sp. besides *S. trijuga* could have been avoided by reference to the publications of Watt and of Glover, not mentioned in the bibliography, which would have added many more hosts to the list given in the publication under review. There are many such instances of double entry which only lead to confusion. *Laccifer mysorensis* is mentioned as found in India which would imply a wide range of distribution while as its name implies it is restricted to Mysore and the British districts adjoining it. *L. lacca* Kerr is stated also to attack *Shorea talura* which many a worker in Bangalore has shown not to be the case. *T. lobata* is supposed to have been named by Chamberlain. He spells his name as Chamberlin and Cockerell (*Psyche*, 1924, **31**, 47) has pointed out it should be credited to Green and Chamberlin has accepted it (*Bull. Ent. Res.*, 1925, **16**, 41). *Metacardia* is wrongly spelled at least in three places for *Metatachardia*. The name *Beesonia dipterocarpi*, Green (*Bull. Ent. Res.*, 1929, **19**, 205) is nowhere mentioned nor the bibliography gives Green's publications later than 1926–27, although the Bulletin was accepted for publication as late as 1932. *Inglisia chelonioides* is not cogeneric with *I. bivalvata*; the latter belongs to the genus *Cardiococcus* (*J. Bom. Nat. Hist. Soc.*, **28**, 4, 1034). *Lecanium colemani* Kann. is a very doubtful species questioned by Green and its non-existence, even in Bangalore, has already been shown. On p. 52 *T. Silvestrii* is given, without reference to any literature or locality, as attacking an *Ixora* sp. while its name is absent from the parasites of *Ixora coccinea*, a mistake which could have been easily avoided by consulting the necessary publication.

S. M.

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REVIEW OF CURRENT LITERATURE RELATING TO PAINT, COLOUR AND VARNISH INDUSTRIES, Jan.-Feb. 1935. Pp. 82. (Research Association of British Paint, Colour and Varnish Manufacturers, Teddington.)

This 82-page volume introduces the reader to the rapid progress made in the various branches of paint, colour and varnish research and every progressive manufacturer in the trade will not fail to appreciate the importance of a review of this kind offered by the Research Association of British paint, colour and varnish manufacturers—a prosperous organisation which is rendering great services to the advancement of the paint industry in Great Britain. A particularly refreshing feature of the review is the importance given to shellac by devoting a special section to record the researches done on this important natural product now struggling to re-establish its pre-eminence. This review will be gratefully welcomed by every one interested either in research or manufacture of paints, colours or varnishes.

M. S.

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LAC AND THE INDIAN LAC RESEARCH INSTITUTE. By Dorothy Norris, M.SC., F.I.C., P. M. Glover, B.SC., and R. W. Aldis, PH.D., D.I.C. (Criterion Printing Works, Calcutta, 1934). Pp. 53. Price Rs. 2–8–0.

The volume aims at giving those interested in the industry from whatever point of view, a concise and non-technical summary of the position when the Institute began its work, and of the results obtained of value to the industry during the last nine years of its activity. The brief summary of the Indian Lac Industry prefacing the volume refers to the pioneering entomological investigations of Tachard, Kerr, Carter, Stebbing, Imms and Chatterjee and Misra. It is unfortunate that there is no reference to the extensive entomological studies of Mahdihassan who was one of the first to establish the trivoltine character of a race of lac insects indigenous to the Mysore plateau. He has been the first to recognise the importance of various races of lac insects in relation to the quality of their lac secretion, a fact of great technical importance.

One wonders if the value of the publication would have suffered if attention had been called to the work of the Indian Institute of Science during the years 1917–1927, for a full period of 10 years during the time of Professors Fowler and Norris. It is difficult to deny that the foundations of biochemical and technological research on lac were laid at the Indian Institute of Science at Bangalore, and the circumstance that all the assistants in the physico-chemical and biochemical sections of the Namkum Institute are men trained at the Institute, bears ample testimony to this fact.

This unfortunate omission of a substantial portion of the recent work on the biochemical, entomological and technological aspects of lac carried out in a sister institution, lends a propagandist touch to the publication.

It would have been of some assistance to the interested public if a financial statement of the Institute were appended to the report. It is difficult to assess the value of fundamental research but where research is definitely meant to assist an industry, the public are taught to estimate the value of research in terms of the increased prosperity or stability which research may bring to the industry.

The revenue from the Lac cess levied by the Government of India amounts to nearly two lakhs a year and the aggregate amount spent on the founding and maintaining the Lac Research Institute at Namkum during the last 10 years, might now exceed twenty lakhs (precise figures are not available). The volume concludes with an impressive array of 88 publications issued from the Institute which we propose reviewing on a future occasion.

M. S.

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REPORT ON THE SOAP INDUSTRY IN CEYLON. (BULLETIN NO. 1, COCOANUT RESEARCH SCHEME, CEYLON. By R. Child, F.I.C., B.SC., PH.D. (Lond.).)

This is the first of a series of bulletins issued by the board of management of the Cocoanut Research Scheme of Ceylon. As the Chairman points out in his introduction "This review of local raw materials that can be used in the manufacture of soap, of soap making process generally and of suggestions helpful to the local industry, comes at an opportune time and from one who has a knowledge of the technology of the industry."

The author commences his report with a critical and exhaustive examination of the various raw materials used for soap manufacture and proceeds to discuss the several soap-making processes now in vogue everywhere. An account of the chemistry of oils and fats is given in a manner, that should appeal itself even to the soap manufacturer who had not had the benefit of a systematic chemical training. Next a fairly detailed examination is made of the local raw materials available with special reference to the different varieties of cocoanut oil.

In discussing the different soap-making processes, the author dwells at length on the *Cold Process*, as the majority of soaps made in Ceylon at present are by this process according to him. Minute practical details are given and this should be of immense benefit particularly to the untrained soap maker. A brief account of the semi-boiled and settled processes of soap-making is also given.

In his recommendations, Dr. Child observes :—

".... the local industry is quite capable of producing cheaply a reasonably good household soap in sufficient quantities. As an encouragement to develop a moderate increase in import duties would probably have good effect; ...The local industry is not in a position to compete in the toilet soap industry at present and 'prohibitive' increases in tariff are undesirable for that reason. An increase of 5 p.c. on all tariffs would not seem unreasonable ...."

Apart from this he suggests the establishment of a Government factory on the model of the Government Soap Factory, Bangalore, and a bureau of chemical advice. There is also a suggestion to control the quality of the soap by the Government by the issue of labels. These are recommendations worthy of serious consideration by the Government.

The report as a whole should commend itself to everyone engaged in the soap industry, directly or indirectly. The board of management of the Cocoanut Research Scheme deserves the thanks of the public for having decided to issue this valuable report gratis to all.

M. S. KRISHNA RAO.

Erratum.

Vol. III, No. 10, p. 493, column 2, para 2, line 4,
For *Ophicephalus stolatus*, read '*Tropidonotus stolatus*'.

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