

for world markets, has more to fear from American receptiveness to new ideas than from any other single factor.

In this country the support of the Department of Scientific and Industrial Research in the foundation of Research Associations is already more than justified by its success in bringing together all types of employer, engaged in particular industries. Contact with outside scientific workers and their more enlightened competitors will inevitably result in a greater appreciation of the advantages of science by the majority of industrial leaders.

Finally, the authors deserve credit for their just appreciation of the special requirements of scientific workers engaged in pioneer research, and particularly of the ways in which such men may be encouraged to prepare for research as a vocation and to follow it without being repressed by works routine. The necessity for supporting pure science work for its paramount object of increasing the sum of human knowledge is strongly emphasised. The book is admirably produced and includes a 16-page bibliography, which should be of service to all interested in the subject.

R. S. H.

### Our Bookshelf.

*Physico-Chemical Problems relating to the Soil: a General Discussion held by the Faraday Society.* (Reprinted from the Transactions of the Faraday Society, Vol. 17, Part 2, February.) Pp. iii + 217-368. (London: Faraday Society, 1922.) 10s. 6d. net.

THE Faraday Society is to be congratulated on the issue of this volume, reprinted from its Transactions; soil investigators in this country now have, in accessible form, a study of one important branch of work from a number of aspects. The volume contains the subject-matter of the general discussion held by the Faraday Society in 1921 on "Physico-Chemical Problems relating to the Soil." There are sixteen papers grouped in the following five sections: (1) Introduction and General Papers, (2) Soil Moisture, (3) Organic Constituents of the Soil, (4) Adsorption Phenomena, and (5) Colloidal Phenomena. The student of soils will find much of interest, not only in the papers themselves but also in the *verbatim* report of the discussion which followed.

Recent work on soils from the standpoint of physical-chemistry has followed two or three main lines, which are discussed in an introductory paper by Sir E. J. Russell. The examination of the soil solution and its relation to soils on one hand and plants on the other, has been much stimulated by the method of the freezing-point depression. American investigators have done much in this direction, and the paper by Prof. Hoagland (California) gives an interesting account of the work to date. Certain assumptions are made in applying

this method to the soil solution, and the deductions which follow are discussed by B. A. Keen (Rothamsted) in the course of a paper on soil moisture. Prof. Shull (Kentucky) reviews various theories on the intake of soil solution through the osmotically active membranes of the root hairs.

The part played by colloidal material in soil naturally forms the subject of several papers. N. M. Comber (Leeds) discusses the flocculation of silt and clay on the assumption that the latter is protected by a siliceous emulsoid, and C. G. T. Morison (Oxford) reviews the theories of pan formation. Dr. Mellor (Stoke-on-Trent) deals with the plasticity of clays used in the ceramic industry. The organic matter in soil is of obvious importance in any discussion of colloidal properties. A general review is given by H. J. Page (Rothamsted), and Prof. Odén (Upsala) describes his own important investigations on humus, which have proved the existence of humic acid and shown that the hypothesis of selective adsorption is not a complete explanation of soil acidity. With regard to soil acidity itself there is one review paper by E. M. Crowther (Rothamsted), while Dr. Salisbury (London) discusses the ecological aspects.

Besides acidity, many other phenomena shown by soils have been interpreted on the basis of adsorption. E. A. Fisher (Leeds) presents an able critical review of work on absorptive processes in soils, with especial reference to inorganic substances.

Finally, there are some papers dealing with more purely physical questions. Prof. Odén gives a detailed account of his elegant method of mechanical analysis and a note on the hygroscopicity of clay, Dr. Hackett (Dublin) discusses the rate of ascent of liquids in granular media, while G. W. Robinson (Bangor) specifies certain physical properties of soil in relation to survey work.

B. A. K.

*A Text-Book of Aeronautical Engineering: The Problem of Flight.* By Prof. H. Chatley. Third edition, revised. Pp. xii + 150. (London: C. Griffin and Co., Ltd., 1921.) 15s. net.

A SECOND edition of Prof. Chatley's book appeared in 1910, and during the war, when interest in aeronautics attained great heights, this book, like many others on the subject, was bought in large numbers, thus necessitating a third edition. Not very much was known about the subject of aeronautics before the war; systematic treatises had not yet appeared, and Prof. Chatley's book achieved a deserved popularity.

Now that a third edition has been issued, claiming to be "revised," the opportunity should have been taken to make the book a more proportioned, authoritative, and modern exposition. There is scarcely room in a text-book for a detailed account of the ornithopter—not because it is *a priori* clear that one should not continue to make attempts at producing machines based on the flapping-wings principle, but because a text-book should contain what is more or less accepted: it should give a safe (not necessarily orthodox) account of the principles used in practice, with some attempt at justification.

A brief introduction on the problem of flight is followed by a useful statement of essential principles. Then comes a chapter on the propeller, treated by

rather rough-and-ready methods. Much of the chapter on the aeroplane is out of date; it is scarcely correct to say that the air-pressure results for plane surfaces can be corrected so as to apply to curved surfaces by slight changes in the constants, and in any case there are plenty of experimental data for giving a correct account of cambered wings. The chapter on the dynamics of aeroplanes is not very full, while a treatment of the parachute by means of differential equations is inserted for little reason, in a book which is not really a mathematical treatise. In addition nearly three of a total of less than 150 pages are occupied with Glaisher's analysis of the motion of the balloon—with the note that it has little practical value! After the chapter on ornithopters we get a short account of dirigibles and the bodies of aeroplanes, etc. There is also a brief account of stability.

Some of the appendices are useful, although the bibliography is disarranged. Foreign names are misspelt, e.g. an umlaut on the "a" in Lilienthal. The author has the ability to produce a real text-book on aeronautics, but the present volume is disappointing.

S. BRODETSKY.

*Die Pendulations-Theorie.* Von Prof. Dr. H. Simroth. Zweite Auflage. Pp. xvi+598. (Berlin: Konrad Grathlein, 1914.) 13.50 marks.

FIRE by a new view of the shifting of the polar axis of the earth the speculative mind of a distinguished zoologist, Simroth, conceived the idea of a relation between earth oscillation and organic development.

The merit of this oscillation theory of organic distribution was its reduction of the rise and spread of organic forms to a single process in relation to recurring secular change. Simroth assumed that the earth forms an oscillation system of a peculiar kind, such that one maximum line of stress runs north and south through Norway, Germany, the line of elevation of the Alps, and across the western Sahara, while the other companion stress line passes through Bering Strait and the Pacific, west of the American coast. Assuming also permanence of the general configuration of the oceans and continents, Simroth then makes his grand assumption, which is that the evolution of genera has recurred along the European line of maximum oscillation (which is therefore the region of creative evolution) in response to secular changes of environment. From this area of distribution those forms that are primitive migrate eastwards or westwards to areas of less disturbance, whilst the progressive forms adapt themselves to the cold of polar uplift or the warmth of equatorial depression. In this way Simroth accounts for the occurrence of allied forms in widely separated parts of the world. Beings are what they are and where they are, as a "function" of the oscillation system.

The new edition of this work does not remove the difficulties of those who refuse to accept Simroth's hypothesis. The new matter consists merely of 33 pages appended to a reprint of the first edition and contains no references to criticisms such as those of Prof. G. C. Bourne (Proc. Zool. Soc. 1911, pp. 802-805) that refer to a fundamental objection—the secondary nature of marine organisms. If Dr. Simroth has not converted his fellow-zoologists, he is not likely to make converts in other biological fields. Granted that we have no simple alternative to his view, yet the assump-

tions on which it rests are not in accordance with modern geological opinion; and if that is so, biological speculation on such a weak basis is only misplaced ingenuity. The earth as a system of stresses is likely to prove a much more complex theme than the one Simroth vaguely describes, while the relation between maximum stress and biological progress requires far more critical examination than he gives to it.

F. W. G.

*Swiss Travel Almanac.* Edited by the Swiss Tourist Information Office. Summer Season, 1922. Pp. 112. (Olten, Switzerland: O. Walter, Ltd.; London: Swiss Federal Railways, Regent Street, 1922).

THIS book is a reminder that Switzerland is ready once more to become "the playground of Europe," and it is especially an appeal to English visitors. The numerous signed essays include one by Mr. A. Latt on "English influences on Swiss intellectual life," recalling many pleasant details of *rapprochement* in the seventeenth and eighteenth centuries. Mr. Schaeuderlin writes finely of the brave hardihood of alpine trees. Good and readable as the essays are, the great charm of the book lies in its illustrations. The well-known scenes of tourist gatherings are relegated to the advertisement pages at the end, and throughout this modestly styled Almanac we are given an exquisite series of photographs, printed in brown, of "trees and woodlands" in the Alps. Each of these appeals delightfully to the naturalist, who will promptly consult the calendar and the tables of exchange.

G. A. J. C.

*Handbook of Commercial Information for India.* By C. W. E. Cotton. Pp. viii+383. (Calcutta: Superintendent Government Printing, India, 1919.) 1 rupee: 2s.

MR. COTTON'S book is a useful volume which gives in a condensed form, and well arranged for reference, notes on all the principal exports of India, including origin, district of growth, processes of preparation, and conditions of export. It does not profess to be a scientific work or in any sense a rival to larger and more complete gazetteers of Indian products. It has been compiled for traders, and with this end in view notes on ports and commercial organisations are added. Among the State departments connected with trade we find a reference to the geological survey but none to the Survey of India or to the Royal Indian Marine. Does this imply that maps and charts have no bearing on trade? It is to be hoped that the demand for this book will result in the publication of an annual edition.

*Das Problem der Genesis des Actiniums.* Von M. C. Neuburger. Sonderausgabe aus der *Sammlung chemischer und chemisch-technischer Vorträge*. Herausgegeben von Prof. Dr. W. Hertz. Band XXVI. Pp. iii+64. (Stuttgart: Ferdinand Enke, 1921.) 5 marks.

THE author discusses the experimental work done on the origin and transformations of actinium, and the various hypotheses which have been put forward as to the successive changes in the actinium series. He concludes that at some stages, besides  $\alpha$ - and  $\beta$ -particles, particles of mass 3 and charge 2 are emitted. There is a detailed list of references, including some so recent as the year 1921.