

place when dealing with tabular matter or in condensed abstracts; but it is very irritating to the reader to be pulled up in a purely narrative section by phrases such as "the liquid is conc. in salt-pans," or "the press. between the surfaces is normal." After such an experience the reader feels an unwonted thrill of gratitude to the Publication Committee of the Chemical Society, which does not even allow these abbreviations in the narrative portions of its abstracts. The saving of space which is achieved in this way is more than lost as the result of inserting the initials of every author even when the same author is mentioned half-a-dozen times in one paragraph. The main idea of quoting the initials of an author is probably correct, even if it appears somewhat superfluous in the case of giants such as Lavoisier and Priestley; but to repeat the initials over and over again, when the text makes it perfectly clear that the same author is being quoted, is a purism which might well be sacrificed, if only in order to find space to print in full the half-finished words which disfigure the second (but not the first) volume of the Treatise.

It will be seen that the criticisms given above refer mainly to the way in which the contents of the Treatise are presented, and not to the contents themselves. The reviewer, who spent some weeks of his vacation in mastering the contents of the two volumes before attempting to criticise them, would therefore like to conclude his comments by again expressing his amazement that a single chemist should have brought together so immense a store of information and have compiled a Treatise which every English chemist will desire to have on his shelves as a masterly guide to the literature of his science. A list of errors is being forwarded to the author.

Physiology of Respiration.

Respiration. By Dr. J. S. Haldane. (Silliman Memorial Lectures.) Pp. xviii+427. (Newhaven: Yale University Press; London: Oxford University Press, 1922.) 28s. net.

DR. J. S. HALDANE'S book is nominally a report of his Silliman lectures delivered at Newhaven; in reality it is an account of his life's work in physiology. No one who turns over the pages can be but impressed with the enormous advance which has been made in the physiology of respiration within the last thirty years, and the degree to which that advance has been due to Dr. Haldane's work and to the stimulating influence which he has wielded over the minds of others.

To those who teach physiology, the contents of the book are for the most part familiar ground. To such, the book at its lowest will form a convenient epitome

of Dr. Haldane's works within the limits of a single cover, but many will delight in reading it because in it they will find a more perfect picture of the genius of the author than is obtainable from the perusal of his works in a less consecutive form.

One of the interesting points which will probably strike the reader is the extent to which Dr. Haldane's discoveries in the realm of pure science have been the result of problems which have confronted him in the province of industrial or applied physiology.

Of industrial physiology—now so recognised a branch of the subject in America—Dr. Haldane may almost be said to have been the founder in this country. More than thirty years ago the author was much concerned to arrive at some explanation of the fact that man could tolerate a concentration of carbon monoxide in mines which, according to what might be expected on theoretical grounds, should prove fatal. The difficulty so raised led to a complete investigation of the quantitative relations of the blood to oxygen and carbon monoxide respectively, and ultimately to his acceptance of the theory of pulmonary respiration put forward by Bohr, namely, that the pulmonary epithelium was capable of secreting oxygen (see chap. v.). It is not our object to discuss here the correctness or otherwise of these and other extremely controversial points in the book. Our concern is to point out that Dr. Haldane's refusal to leave an important point in the physiology of mines unexplained has led to a great volume of work both by himself and by others which, taken together, has given a quite unusual impulse to physiological research.

From chapters xi., xii., and xiii. it may be gleaned that in the 'nineties of last century and the early part of the present one, Haldane was much occupied with the analysis of mine air, of the air in tunnels, in ships, and in caissons. To the effects of sudden compression and decompression may probably be traced his interest in the effects of altered barometric pressure upon the human frame. The present volume facilitates the taste of the student who would acquaint himself with these problems, for hitherto much of its author's work on them has been hid away in blue books, mining reports, technical journals, and the like, so that it was difficult for the ordinary reader of physiological literature even to become appraised of its existence. In this connexion it is much to be regretted that the book lacks an index. If, as may confidently be expected, the present edition is followed at no great date by another, we hope that this omission will be made good. The book must surely be to a great extent a work of reference, and a book of reference without an index loses much of its usefulness.

The reader cannot scan the pages without observing

the large number of persons who have been privileged to collaborate with Dr. Haldane. To that company the book will mean something more than a mere recapitulation of his work or a history of the development and philosophic position, or a commentary on the action and reaction of abstract science on industrial research; it will mean something a little sacred, but something which one of them, at all events, finds some difficulty in putting into words.

JOSEPH BARCROFT.

Our Bookshelf.

An Introduction to Sedimentary Petrography: With special reference to loose Detrital Deposits and their Correlation by Petrographic Methods. By Henry B. Milner. Pp. 125. (London: T. Murby and Co., 1922.) 8s. 6d. net.

THIS attractive little book deals mainly with loose detrital deposits and their correlation by petrographic methods. The first chapter gives an account of sampling, treatment, and methods of examination in about a dozen pages. The next chapter (56 pages) deals with detrital minerals and is illustrated by numerous plates showing the shapes and appearances of loose grains and crystals. Following this are two chapters in which a courageous effort is made to show the value of the evidence provided by detrital minerals as a means of stratigraphical correlation, and as an aid in palæogeographical studies. A useful bibliography, a table showing the distribution of detrital minerals in British strata, and an index are included.

It is not easy to share Mr. Milner's confidence in the inferences he draws from the evidence provided by the mineral composition of sediments. Such evidence is rather unsafe as a basis of stratigraphical correlation, owing to the rarity and local significance of instances in which detrital minerals are derived from what he calls "homogeneous distributive provinces." The difficulty of generalising safely on the genesis of detritus is illustrated very forcefully by Mr. Milner's statement that a garnet-staurolite-kyanite suite suggests derivation from a definite thermo-metamorphic province, while a sphene-apatite-zircon assemblage is indicative of acid or intermediate rock-types as sources of supply, whereas an ilmenite-anatase-rutile-brookite association points to derivation from basic or ultrabasic rock-types.

These are, to say the least, highly controversial statements, but they tend to make the subject interesting and to stimulate further work; for, as Mr. Milner very properly remarks, the aim of science should be not merely to collect facts, but to explain them, and to put them to service in the solution of larger problems. The difficulty in this particular case is that the facts available are as yet scanty and very local in their significance. Much patient fact-collecting remains to be done before it can be ascertained whether any given system or series has definite characteristics as regards the nature and mineral composition of its detritus, and what those characteristics are. Not until this work has been done will it be safe to assert that the evidence provided by detrital minerals is useful in any substantial way as a basis of stratigraphical correlation.

T. C.

Universal Problems. By H. Jamyn Brooks. Pp. 123. (Braintree, Essex: The Author, The Limes, Shalford, 1922.)

REVIEW by quotation is not usually desirable, but with books of the class to which Mr. Brooks's belongs it is the only possible method. It will suffice to quote at random three of the eight "hypotheses on which the theories discussed in the work are founded."

"1. Every element, whether it be chemical, physical or mental, is distributed in unbroken unity throughout universal space."

"5. The mode of progression of the physical forces through matter and space is by communicated combustion, as is illustrated by the ignition of a train of gunpowder."

"7. Energy is the force which becomes manifest through expansion and contraction."

At first we are inclined to be amused, but really such books are tragic, not comic. For Mr. Brooks lacks neither intelligence nor enthusiasm. He has read enormously, and he has actually printed with his own hands the little book in which his views are presented. If only that intelligence and enthusiasm had been combined with the desire and the capacity to study science seriously! If only he had given to a few elementary text-books and a short course of laboratory work the time and application he has given to encyclopædia articles and "popular" treatises! Faced with such results as this, we are forced to ask ourselves whether the "popularisation" of science is all or mainly gain. Has Prof. Eddington, for example,—his book is quoted more frequently than any other—done good to science by arousing the interest of untrained readers, or harm by encouraging the delusion that they can really understand?

N. R. C.

Mechanical Testing: A Treatise in Two Volumes. By R. G. Batson and J. H. Hyde. (Directly-Useful Technical Series.) Vol. 1: *Testing of Materials of Construction.* Pp. xiii+413. (London: Chapman and Hall, Ltd., 1922.) 21s. net.

THE contents of this volume deal with the testing of materials of construction; the testing of apparatus, machines, and structures will be included in the second volume. The authors have had extensive experience in the National Physical Laboratory, and this is reflected in their book. A large number of engineers in this country are now alive to the importance of continually testing the materials they employ, and to such the volume will be welcome on account of the information it contains regarding modern methods of testing. The student will also find the book useful, since no college laboratory contains all the apparatus described, and text-books on materials usually have only brief sections on the apparatus employed in testing. The greater part of the volume is devoted to the testing of metals; besides the ordinary simple commercial tests, we find chapters on the repetition of stress, combined stresses, hardness testing, impact testing, and the effects of temperature. The book closes with chapters on the tests of timber, stone, brick, concrete, road materials, limes, and cements. Sufficient information is given regarding the results of methods of testing to enable the experimenter to compare his own results with average values for trustworthy materials.