

SCIENCE

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FRIDAY, FEBRUARY 23, 1900.

ARE FURTHER EXPERIMENTS NEEDED FOR
DETERMINING THE ATOMIC WEIGHT OF
OXYGEN?*

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THE precision of experiments on the atomic weight of oxygen has been gradually so much increased that, in some cases, the mean error of a single determination is less than 1 part in 10,000. The agreement of different series of experiments is not so good, but if the work of different experimenters agreed well, the question, how accurately do we really know the atomic weight of oxygen, is not one which we can readily answer. Neither the concordance of the experiments of a given series, nor the agreement of the results of series of experiments by different observers, can excuse us from search for sources of error. All sciences which have to do with measurement afford sufficient instances of the fact that our conclusions are to be received with a certain suspense of judgment. And chemistry well illustrates that he is wise whose assertions regard the possibility of finding at some time evidence to the contrary.

The history of experiment on the atomic weight of oxygen affords an interesting example of the fact that neither the concordance of individual observations nor the agreement of different experimenters proves that a measurement is right. To-

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor, J. McKeen Cattell, Garrison-on-Hudson, N. Y.

* President's address, delivered before the New Haven Meeting of the American Chemical Society.

sion of Entomology of the U. S. Dept. of Agriculture have been drawn on heavily for the book's illustration. One hundred and one out of the one hundred and eighty-three figures are from this source.

A brief but good bibliography is appended and there is an index. The work of printers and binders has been tastefully done. Altogether the book is a useful one, and one that can be recommended to beginning students of insects.

VERNON L. KELLOGG.

STANFORD UNIVERSITY, CALIF.

The Strength of Materials. By J. A. EWING, Professor of Mechanism and Applied Mechanics in the University of Cambridge. Cambridge, The University Press. 1899. Octavo. Pp. 246.

It will be news to many Americans to learn that instruction in the subject of the strength of materials is now given at the University of Cambridge and that laboratory work in testing is done there. The mathematical theory of elasticity has long received attention at the universities of England and Scotland, as shown by the works of Todhunter and Pearson, of Love, and of Thompson and Tait; this theory and these volumes have, however, added little to the practical knowledge of the properties of materials and have not influenced engineering constructions. At last, after many years of waiting, there comes from Cambridge a book which recognizes the fact that observation and experiment are essentially necessary, and which sets forth the fundamental principles and facts in a manner likely to be of much value to the engineering students and civil engineers of Great Britain.

In its theoretical discussions the book covers about the same ground as that given in American engineering colleges, but there are few numerical exercises and no problems for solution by the student. That such problems are necessary is, however, recognized by the author in his preface which states that the volume is a lecture room treatment of the subject and should be supplemented by laboratory work and computations. The theory is not given isolated from experience, but methods of testing are explained in an interesting manner, and the

principal conclusions of the authorities in all countries are noted. Processes of manufacture which influence strength and ductility also receive some attention. The theory of beams, columns and shafts is presented clearly and concisely, and the subject of stresses in trusses and arches is briefly treated. The author has succeeded admirably in putting much sound doctrine and practical information into a limited space. The notation and terminology leans toward that of the mathematical theory of elasticity, but here and there the author breaks away from that bondage and uses the notation of engineering literature. In short this happy wedlock of theory and practice is one upon which the University of Cambridge should be congratulated. No book has appeared in England in recent years which so fully corresponds to the American ideal of a text-book for sound and successful education.

M. M.

GENERAL.

PART V. of the 19th Annual Report, and accompanying Atlas, consists of a collection of papers and reports of the U. S. Geological Survey descriptive of the forests of the West, especially of certain of the forest reserves created by Executive Order of February 22, 1896, prominent among which are the Black Hills, Bighorn, Teton, Yellowstone Park, Priest River, Bitterroot and Washington Forest Reserves. Copies may be secured through United States Senators and Representatives, or by application to the Survey.

THE Liverpool School of Tropical Medicine has just issued a memoir, or small book, containing 'Instructions for the Prevention of Malarial Fever,' for the use of residents in malarious places.

BOOKS RECEIVED.

The Ore Deposits of the United States and Canada..

JAMES FURMAN KEMP. New York and London, The Scientific Publishing Co. 1900. Pp. xiv + 481.

Annals of the Astronomical Observatory of Harvard

College. EDWARD C. PICKERING, Director. *Visual Observations of the Moon and Planets.* WILLIAM H. PICKERING. Vol. XXXII. Part II. Pp. iv +

117-317. Plates viii-xiv. *Miscellaneous Researches.* Vol. XXXIII. Pp. 287. *Observations made at the*

Blue Hill Meteorological Observatory. A. LAWRENCE ROTCH. Pp. 131-280. Cambridge, 1900.

Cyclopedia of American Horticulture. L. H. BAILEY assisted by WILHELM MILLER and many expert Cultivators and Botanists. In 4 volumes. New York, The Macmillan Company. 1900. Vol. I. A.-D. Pp. xxii + 509. \$5.00.

SCIENTIFIC JOURNALS AND ARTICLES.

American Chemical Journal, January, 1900. 'On the Molecular Rearrangement of *o*-Aminophenylethyl Carbonate to *o*-Oxyphenylurethane,' by J. H. Ransom. 'Diazocaffeine,' by M. Gomberg. 'The Action of Ethyl Iodide on Tartaric Ester and Sodium Ethylate,' by J. E. Bucher. This number also contains a note on 'Improvements in the Manufacture of Sulphuric Acid.'

February, 1900. 'On Some Abnormal Freezing-point Lowerings produced by Chlorides and Bromides of the Alkaline Earths,' by H. C. Jones and V. J. Chambers. 'The Preparation of Pure Tellurium,' by J. F. Norris, H. Fay and D. W. Edgerly. The authors first prepared pure basic nitrate and then prepared the tellurium from this. 'The Reduction of Selenium Dioxide by Sodium Thiosulphate,' by J. F. Norris and H. Fay. 'Action of Picryl Chloride on Pyrocatechin in Presence of Alkalies,' by H. W. Hillyer. 'Camphoric Acid,' by W. A. Noyes. 'On the Rearrangement of Imido-esters,' by H. L. Wheeler. 'The Double Halides of Antimony with Aniline and the Toluidines,' by H. H. Higbee. 'On the Rancidity of Fats,' by I. Nagel. A note on 'The Wax of the Bacillariaceæ and its Relation to Petroleum.' J. ELLIOTT GILPIN.

The American Naturalist for January is a little late in making its appearance, but its contents may excuse the delay. The first article, by Henry Fairfield Osborn, is a most important contribution to the subject of 'Intercentra and Hypapophyses in the Cervical Region of Mosasaurs, Lizards and Sphenodon,' and is well illustrated. Ales Hrdlicka describes in some detail the 'Arrangement and Preservation of Large Collections of Human Bones for Purposes of Investigation,' and A. D. Mead has an article 'On the Correlation between Growth and Food Supply in Starfish,' in which he shows that starfishes of the same age may vary greatly in size. E. H. Eaton discusses

'The Zoology of the Horn Expedition' to Central Australia, and its bearing on the faunal affinities and geologic changes of Australia, and Henry Fairfield Osborn notes 'A Glacial Pot-Hole in the Hudson River Shales near Catskill, N. Y.' John H. Lovell in 'The Visitors of the Caprifoliaceæ,' describes the structural peculiarities of various genera and species of the honeysuckle family and notes the species of insects which he has observed to visit them, supplementing his notes by the observations of others. There is a large number of reviews, particularly of zoological papers.

THE *Journal of the Boston Society of Medical Science* for January opens with an article by Harold C. Ernst on 'Instruction in Bacteriology in the Medical Schools of America and Europe,' giving an analysis of the replies received from ninety-eight institutions to a circular letter of inquiry. The remainder of the number is devoted to abstracts of papers presented at the meeting of the American Public Health Association, Section of Bacteriology and Chemistry, held October 30, 1899.

SOCIETIES AND ACADEMIES.

SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

At a special meeting of the Science Club of the University of Wisconsin, on the evening of January 24th, Mr. T. C. Chamberlin, of the University of Chicago, addressed the Club on 'Some recent studies of fundamental problems in geology.' Mr. Chamberlin was for five years president of the University of Wisconsin, and a large audience gathered to greet him and to listen to his admirable presentation of an exceedingly difficult subject. By reason of the fact that many of his hearers were not specialists in science, the address was semi-popular, and by special request of the president of the Club, Mr. C. R. Van Hise, it treated particularly of Mr. Chamberlin's well-known studies in this field. These studies have already engaged his attention for a number of years and are not yet completed. Some of the most important conclusions reached by Mr. Chamberlin were given to his audience as he explained 'in confidence to his friends,' as they are not