Radio-activity. By E. Rutherford, D.Sc., F.R.S., etc. Second edition, 1905. Cambridge, The University Press; New York, The Macmillan Co. Cambridge Physical Series. Edited by F. H. Neville, F.R.S., etc., and W. C. D. Whetham, F.R.S., etc. 8vo. Pp. xiv + 580. Price $4.00.

It is but a short time ago since the first edition of this work (1904) was reviewed at length in these columns. The rapid appearance of a second edition is characteristic of the energy of the author; but it also bespeaks the intense interest which the subject has aroused and the adequacy with which the demand has been met by Mr. Rutherford. The new treatise gives evidence of the same skilful presentation and arrangement as the old, though there has been expansion in bulk from 389 to 580 pages. Among the more conspicuous novelties are the chapters on the transformation products of uranium, thorium, actinium, radium and on the rate of emission of energy. In other chapters the recent growth of our knowledge of the alpha rays is noteworthy. The book is provided with an excellent index.

The present very carefully edited work of Professor Rutherford, together with the two ponderous volumes of original papers just issued on behalf of the French Physical Society by MM. H. Abraham and P. Langevin, not to mention other sources, places the whole domain of radio-activity within easy reach of the student. All this information is virtually given at first hand. What remains to test his endurance is the ever-growing mass of research with which the subject is barricading itself, and the increasing difficulties of treatment.

C. Barus.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for January is an unusually interesting number, being devoted to live, or living, subjects. The first article on 'Flying-fish Flight, and an Unfixed Law of Nature,' by C. D. Durnford, brings forward evidence to support the views of those who believe that the flight of this fish is active and not purely a sail. It may be said that this view is held by many good observers and that additional testimony may be found in *Forest and Stream* for January 27. G. H. Parker discusses 'Double Hen's Eggs,' concluding that they are due to the retention of an egg in the oviduct and its surrounding by a second. W. A. Cannon treats of the 'Biological Relations of Certain Cacti,' including their root structure and adaptations for the absorption and storage of water. H. Drexler and L. Freund present some welcome 'Contributions to [our knowledge of] the Physiology and Biology of the Dugong,' a common but little-known animal. There is a notice of a congress of oceanography to be held this year at Marseilles.

The Journal of Comparative Neurology and Psychology for January contains an article of 109 pages, with 16 plates, on 'The Structure of the Teleostean and Selachian Brain,' by Dr. C. U. Ariens Kappers, of Amsterdam, comprising as complete a description of the microscopic anatomy of these brains as could be made from Weigert sections, together with full digests of all important literature. Such a comprehensive study has long been needed and will probably serve as the point of departure for more special studies in the neurology of fishes for a long time.

Popular Science Monthly for February contains the following articles:

Charles Keyser Edmunds: 'The Passing of China's Ancient System of Literary Examinations.'

Joseph Jastrow: 'The Lapses of Speech.'

Edwin W. Bowen: 'What is Slang?'

S. Tetsu Tamura: 'Recent Advances in Meteorology and Meteorological Service in Japan.'

Ernest W. Brown: 'With the British Associatio in South Africa.'

C. A. Miller: 'Some Recent Tendencies in Mathematical Instruction.'

A. C. Lane: 'The Wealth of the Commonwealth, its Consumption and Conservation.'

W. Le Conte Stevens: 'The Honor System in American Colleges.'

The Bulletin of the South Carolina College for January, the most recent addition to museum publications, deals with the rehabilitation of the museum of that institution and includes articles on various branches of mu-

seum work. The chapter on 'The Mineralogical and Geological Cabinets,' by D. S. Martin, contains many interesting references to Cooper, Le Conte, Holmes and others of our earlier mineralogists and geologists.

SOCIETIES AND ACADEMIES.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 610th meeting, the 35th annual meeting, was held on December 30, 1905, President Littlehales in the chair.

The report of the secretaries showed 126 members on the active list, a small net gain during the year, and 74 on the absent list.

The report of the treasurer showed an income of $802.19 and expenses of $413.27 during 1905.

The following officers were elected for the year 1906:

President—Cleveland Abbe.

Vice-Presidents—A. L. Day, E. B. Rosa, L. A. Bauer and J. F. Hayford.

Treasurer—Bernard R. Green.

Secretaries—C. K. Wead and G. K. Burgess.

General Committee—W. A. DeCaivelry, W. S. Eichelberger, L. A. Fischer, C. Adler, R. A. Harris, J. Page, C. G. Abbot, L. J. Briggs and I. Winston.

To this committee there will be added such of the past-presidents residing in Washington as shall consent to serve on it.

THE 611th meeting was held on January 13, 1906, President Abbe in the chair.

Mr. C. G. Abbott read a paper on 'A Standard Pyrheliometer and its Use on Mt. Wilson in California.'

Three independent lines of research are being carried on by the Smithsonian Astrophysical Observatory to determine if the output of solar radiation is variable. One of these consists in obtaining values of the 'solar constant' of radiation outside our atmosphere, by the spectro-bolometric method of homogeneous rays practised many years ago by Mr. Langley on Mt. Whitney. The author was in charge of a Smithsonian Observatory expedition to Mt. Wilson in California to determine solar constant values during the past summer and autumn, and had with him a complete duplicate of the outfit simultaneously used for the purpose in Washington.

Measurements by the pyrheliometer or actinometer of the total radiation reaching the surface of the earth are necessary, as well as spectro-bolometric observations. Distrust was entertained of the accuracy of all instruments heretofore proposed as standard actinometers or pyrheliometers, for the reason that the rays are always received upon a front, or outside surface, while the measurements of temperature are made behind or within. Hence the absorbed heat has a path of direct escape to the surroundings and no allowance for this can be made either by cooling corrections, by reading with the temperature recording apparatus at the temperature of the surroundings or otherwise. In illustration, the nature of the error in the instruments of Pouillet, Ångstrom, Nichols and Hull and others, was pointed out.

No easy method of determining the magnitude of the error being found, a new instrument in which the rays are absorbed at the conical rear end of a tube-like blackened and diaphragmed chamber was devised. This chamber is approximately the 'black body,' or perfect absorber, of Kirchhoff, so that no correction for reflection is needed. On account of its shape there is great hindrance to the escape of heat by radiation or convection, so that the heat will almost wholly be retained somewhere on the walls. The chamber walls are bathed by a spiral current of water whose difference of temperature before and after passage is determined by a platinum thermometer. To assure that no heat is lost, a known current of electricity can flow through a coil of wire near the rear within the absorbing chamber, and this known heating can be determined as if it came from the sun. The mean of nine comparisons made in this way on Mt. Wilson indicated 100.4 per cent. of the heat introduced found, with a probable error of less than half per cent. Sun heat is more favorably received than coil heat and should be more exactly measured.

The instrument is naturally perfectly continuous in its action, and was mounted equatorially on Mt. Wilson, the galvanometer