authorities, and even the qualifications of members of the Board assigned to special posts in connection with work of science and technology, subjects and methods of instruction, and the like. The matter was brought before the House of Commons on January 26 by Sir Philip Magnus, who asked the Prime Minister "whether he will consider the desirability of appointing a Committee of Members of the House of Commons, and of other persons interested in and having a practical knowledge of the subject, to inquire into the present organisation of education in this country, and to report as to whether, having regard to the experience gained in the operations of the war and to the new social and economic conditions that may result when the war is over, any and, if so, what changes it may be thought advisable to introduce into our national system of education, with a view to establishing, without unduly interfering with other aims, a closer connection between our commercial and industrial requirements and the teaching provided in our several educational institutions, and in order to secure such further development as may be found necessary of existing facilities for scientific research and the better training of all classes of the population for the activities in which they may be severally engaged?" Mr. Asquith's reply was somewhat evasive of the points raised; and the substance of it was that he did not think it would be desirable to set up the Committee suggested, and that the President of the Board of Education would be glad "to consult all persons or bodies who are in a position to give advice on this matter." As the functions and influence of the Board itself are among the main points requiring consideration, the reply cannot be regarded as very satisfactory, and we hope that Sir Philip Magnus will raise the matter again. The Board is now practically the supreme governing body, not only of almost every grade and class of school, but also of most of our university institutions; and in its hands lies the scheme for the development of scientific and industrial research. As we understand the question, one of the objects of the Committee would be to inquire whether the Board is promoting educational and other work adapted to modern conditions and national needs, and whether practical and scientific studies can receive adequate attention under its present constitution. There are many who think otherwise, and a Committee could determine whether the dissatisfaction is well founded or not.

A COMMITTEE of the Association of Public School Science Masters has drawn up a strong memorandum on the unsatisfactory position which science occupies in national affairs, and particularly in our public schools and the old universities. The memorandum is signed by many distinguished leaders of scientific work and thought, and communications with reference to it are invited by the committee; they should be addressed to the secretary, Reorganisation Committee, 107 Piccadilly, London, W. A few of the matters mentioned in the memorandum are here summarised: Not only are our highest Ministers of State ignorant of science, but the same defect runs through almost all the public departments of the Civil Service. It is nearly universal in the House of Commons, and is shared by the general public, including a large proportion of those engaged in industrial and commercial enterprise. An important exception to this rule is furnished by the Navy, and also by the medical service of the Army. Our success now, and in the difficult time of reorganisation after the war, depends largely on the possession by our leaders and administrators of scientific method and the scientific habit of mind. For more than fifty years efforts have been made by those who are convinced of the value of training in experimental science to obtain its introduction into the schools and colleges of the country as an essential part of the education given therein. At Cambridge only four colleges are presided over by men of scientific training; at Oxford not one. Of the thirty-five largest and best known public schools thirty-four have classical men as headmasters. Science holds no place in the list. Science has been introduced as an optional subject for the Civil Service examinations, but matters are so arranged that only one-fourth of the candidates offer themselves for examination in science. It does not pay them to do so; for in Latin and Greek alone (including ancient history) they can obtain 3200 marks, while for science the maximum is 2400, and to obtain this total a candidate must take four distinct branches of science. For entrance into Woolwich, science has within the last few years been made compulsory, but for Sandhurst it still remains optional. This college is probably the only military institution in Europe where science is not included in the curriculum. If a Bill were passed directing the Civil Service Commissioners and Army Examination Board to give a preponderating—or at least an equal—share of marks in the competitive examination to science subjects, with safeguards so as to make them tests of genuine scientific education and not an incentive to mere "cram," the object we have in view would be obtained. Eventually the Board of Trade would be replaced by a Ministry of Science, Commerce, and Industry, in full touch with the scientific knowledge of the moment. Public opinion would compel the inclusion of great scientific discoverers and inventors as a matter of course in the Privy Council, and their occupation in the service of the State. Our desire is to direct attention to this matter, not in the interests of existing professional men of science, but as a reform which is vital to the continued existence of this country as a Great Power.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 27.—Sir J. J. Thomson, president, in the chair.—Prof. J. **Joly**: A collision predictor. The collision predictor is a mathematical instrument of simple construction. It enables the mariner when navigating in fog or thick weather to foretell risk of collision with another ship, and also the moment at which the risk is greatest. The ships concerned are supposed to be aware of each other's course and speed, and (at intervals) of their distance apart. The determination of distance is made according to principles described in a previous communication to the Royal Society. The operation of taking a reading on the collision predictor takes less than half a minute. The construction of the instrument and the principles involved cannot be conveyed without diagrams.—Dr. C. **Chree**: Discussion of Kew magnetic data, especially the diurnal irregularities of horizontal force and vertical force, from ordinary days of the eleven years 1890 to 1900. The paper is mainly devoted to a discussion of the results of measurements of the horizontal force and vertical force curves from the magnetographs at Kew Observatory for the eleven years 1890 to 1900. Subsequent to 1900, artificial electric currents diminished the value of the curves. One of the main objects is the study of the diurnal variation as given by "ordinary" days, *i.e.* all days with the exception of the highly disturbed. The changes of the regular diurnal variation throughout the year are dealt with in detail, and the inequalities are expressed in Fourier series. An investigation is also made of the annual inequality. For this purpose use is made of results for years subsequent to 1900, as well as of those between 1890 and 1900. The relation

of the diurnal inequality to sun-spot frequency is considered in the light of Wolf's formula, the constants in the formula being determined by least squares. Considerable attention is also paid to the absolute daily range or difference between the extreme values for the day. The frequency of occurrence of ranges of different size is considered in detail.—G. W. **Walker**: A portable variometer for magnetic surveying. The paper contains an account of a portable magnetic variometer for measuring horizontal force in a magnetic survey. The results obtained with it and with a Kew unifilar at forty-eight stations in the course of the magnetic survey of the British Isles in 1915 are discussed. The operation of measuring force is reduced to a single reading of the instrument, with a reading of the temperature, at a definite instant of time, in place of the elaborate system of readings taking over an hour when a unifilar is used. It is estimated that the normal error is not likely to exceed 5γ.—Prof. J. C. **McLennan**: The single-line spectrum of magnesium and other metals, and their ionising potentials. It has been shown that magnesium vapour traversed by electrons can be stimulated to the emission of a single-line spectrum consisting of the wave-length $\lambda=2852{\cdot}22$ A.U. It has been shown that the absorption spectrum of non-luminous magnesium vapour contains an absorption band at $\lambda=2852{\cdot}22$ A.U., and one at $\lambda=2073{\cdot}36$ Å.U. As the lines $\lambda=2852{\cdot}22$ Å.U., and $\lambda=2073{\cdot}36$ Å.U., are respectively the first members of the series $\nu=2,p_2-1{\cdot}5$, S, and $\nu=1{\cdot}5$, $S-m$, P, respectively, the absorption spectrum of magnesium vapour has been shown to be analogous to the absorption spectra of the vapour of mercury, zinc, and cadmium. The ionising potentials have been deduced for atoms of magnesium, in addition to those for the atoms of mercury, zinc, and cadmium. Considerations have also been presented which show that if Bohr's theory affords an explanation of the origin of single-line spectra, then Frank and Hertz and also Newman must have placed a wrong interpretation on the results of their direct investigation of the ionising potentials for mercury atoms.—F. **Tinker**: The microscopic structure of semi-permeable membranes, and the part played by surface forces in osmosis. Microphotographs of the common precipitation membranes, taken by a new method, show that such membranes are composed of small precipitate particles packed closely together, and ranging from $0{\cdot}1\ \mu$ to $1{\cdot}0\ \mu$ in diameter. Each of these precipitate particles is, however, not simple in structure, but is itself an aggregate formed by the flocculation of smaller ultra-microscopic particles. Of the membranes examined, copper ferrocyanide and Prussian-blue have the smallest particles. Precipitation membranes show most of the physical properties of gels as ordinarily prepared by bulk precipitation, but they have not the same mechanical structure as the latter, the membrane having a much finer texture than the gel proper. The pores in a copper ferrocyanide membrane range from $8\ \mu\mu$ to $60\ \mu\mu$ in diameter. Their size is such that they can block colloidal molecules mechanically, but not the ordinary crystalloidal molecules even when highly hydrated. The order of a series of membranes with respect to pore size is the same as that of their efficiency as semi-permeable membranes. Copper ferrocyanide and Prussian-blue are the most efficient membranes, and they have also the smallest pores. There is a very close connection between the osmotic properties of a membrane and the extent to which the membrane capillaries are under the control of surface forces. Osmotic effects are probably the result of adsorption phenomena occurring at the surface of the membrane and in the capillaries, the membrane being relatively impermeable to solutes negatively adsorbed, but permeable to solutes positively adsorbed.—E. **Newbery** and J. N. **Pring**: The reduction of metallic oxides with hydrogen at high pressures. Metallic oxides have been heated to temperatures of 2500° C. in dry hydrogen at pressures up to 150 atmospheres, water vapour being removed by metallic sodium. The following oxides were reduced to metals:—

Cr_2O_3 to Cr. MnO_2 to Mn.

The following oxides were reduced to lower oxides:—

V_2O_5 to VO TiO_2 to TiO.
Nb_2O_5 to NbO. CeO_2 to Ce_2O_3.
U_3O_8 to UO_2.

The following oxides were unchanged:—

Al_2O_3, MgO, ZrO_2, Y_2O_3, ThO_2.

The metals obtained, chromium and manganese, are probably the purest samples of these metals that have been prepared up to the present. This supposition is supported by the sharp nature of their melting points, a feature which has not been observed with samples prepared by other methods.—H. **Levy**: Discontinuous fluid motion past a curved boundary. The author considers the regions in the $w(=\phi+i\psi)$ and $\Omega(=\log dz/dw)$ planes, corresponding to the problem of the discontinuous motion of a fluid in two dimensions past a curved boundary, and shows that the problem will be solved if the formulæ can be found to transform these regions conformally into the same region in a t-plane. This the author succeeds in accomplishing by a synthetic method he has devised—the vectorial superposition of rectangles in the Ω-plane. By this means it is demonstrated that the problem of the impact of a fluid against a boundary, differing by as little as may be desired from a given boundary, may be easily solved. The author pursues in full detail the case of symmetrical surfaces and of plane surfaces with curved ends. A few particular cases are worked out completely.

Royal Meteorological Society, January 19.—Major H. G. Lyons, president, in the chair.—Major H. G. **Lyons**: Winter climate of the eastern Mediterranean. During the last fifteen to twenty years a large number of meteorological stations have been in operation, and from their published results we have an accurate and detailed knowledge of the meteorological conditions which prevail there at the different seasons of the year. These vary from the true continental climate of the Balkans, with its low winter temperatures and moderate rainfall at all seasons, to the Mediterranean climate of southern Greece and the Levant, with its mild winter, hot summer, and a strongly marked rainy season in winter. In lower Egypt these characteristics also prevail in a more intense form. The geographical character of the Balkan Peninsula and the surrounding seas, Syria and Palestine, and lower Egypt, affect to some extent the general climatic conditions. The temperature in the Balkan region in winter is frequently very low, descending to 0° F., and often below this at many stations, while frost occurs often at inland Greece, and occasionally throughout the eastern Mediterranean. January is the coldest month, and February differs but little from it, the first marked departure from winter conditions occurring in March. By this month, too, the waters of the Mediterranean begin to grow warmer. In winter rainfall is heaviest on the western shores of Greece and Syria, and markedly less on the eastern coasts. The Balkan rainfall has a maximum in November and afterwards decreases slightly, but it is not heavy at any time. Rainfall decreases southward, and in lower Egypt the amount is insignificant. Northerly winds which cause rough sea in the Ægean Sea during the winter months are more frequent than southerly winds in the proportion of 2·5 to 1.

Challenger Society, January 26.—Prof. E. W. McBride in the chair.—C. Tate **Regan**: Larval fishes from the Antarctic. The development of *Myctophum antarcticum* was contrasted with that of the northern *M. glaciale,* and larval and post-larval stages of species of Nototheniidæ and related families were described.

BOOKS RECEIVED.

A History of the Family as a Social and Educational Institution. By Prof. W. Goodsell. Pp. xiv+588. (New York: The Macmillan Company; London: Macmillan and Co., Ltd.) 8*s.* 6*d.* net.

Anuario del Observatorio de Madrid para 1916. Pp. 645. (Madrid: Bailly-Balliere.)

Transactions of the Royal Society of Edinburgh. Vol. li. Part 1 (No. 4). The Temperatures, Specific Gravities, and Salinities of the Weddell Sea and of the North and South Atlantic Ocean. By Dr. W. S. Bruce, A. King, and D. W. Wilton. Pp. 169. (Edinburgh: R. Grant and Son; London: Williams and Norgate.) 8*s.* 3*d.*

Proceedings of the Royal Society of Edinburgh. Session 1914–15. Part iii., vol. xxxv. Pp. 225–402. (Edinburgh: R. Grant and Son; London: Williams and Norgate.)

East Lothian. By T. S. Muir. Pp. viii+117. (Cambridge: At the University Press.) 1*s.* 6*d.* net.

The Observer's Handbook for 1916. Pp. 76. (Toronto: Royal Astronomical Society of Canada.)

Termodynamik. By P. B. Freuchen. Pp. 144. (Kobenhavn: Lehmann and Stages Forlag.)

Calendario del Santuario di Pompei Basilica Pontificia del SS. Rosario in Valle de Pompei, 1916. (Valle di Pompei.)

Senescence and Rejuvenescence. By C. M. Child. Pp. xi+481. (Chicago: University of Chicago Press: London: Cambridge University Press.) 4 dollars net.

Chemical Constitution and Physiological Action. By Prof. L. Spiegel. Translated, with additions, by Dr. C. Luedeking and A. C. Boylston. Pp. v+155. (London: Constable and Co., Ltd.) 5*s.* net.

Forging of Iron and Steel. By W. A. Richards. Pp. viii+219. (London: Constable and Co., Ltd.) 6*s.* 6*d.* net.

The Carnegie Trust for the Universities of Scotland. Fourteenth Annual Report (for the year 1914–15). Pp. 81. (Edinburgh: T. and A. Constable.)

Annuaire Astronomique et Météorologique, 1916. By C. Flammarion. Pp. 431. (Paris: E. Flammarion.)

Flora of the Presidency of Madras. By J. S. Gamble. Part 1. Pp. 200. (London: West, Newman and Co., and Adlard and Son.) 8*s.*

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 3.

ROYAL SOCIETY, at 4.30.—Note on an Orderly Dissimilarity in Inheritance from Different Parts of a Plant: Prof. W. Bateson and C. Pellew.—Observations on Coprozoic Flagellates, together with a Suggestion as to the Significance of the Kinetonucleus in the Pinucleata: H. M. Woodcock.—Investigations dealing with the Phenomena of Clot Formations. III. Further Investigations of the Cholate Gel: S. B. Schryver.—The Mechanism of Chemical Temperature Regulation: J. M. O'Connor.

ROYAL INSTITUTION, at 3.—Industrial Applications of Gaseous Fuels derived from Coal: Prof. W. A. Bone.

FRIDAY, FEBRUARY 4.

ROYAL INSTITUTION, at 5.30.—Fifteen Years of Mendelism: Prof. W. Bateson.

GEOLOGISTS' ASSOCIATION, at 8.—Presidential Address: The Geological History of Flying Invertebrates: G. W. Young.

MONDAY, FEBRUARY 7.

SOCIETY OF ENGINEERS, at 5.30.—Presidential Address: P. Griffith.

ARISTOTELIAN SOCIETY, at 8.—The Relation between the Theoretic and Practical Activities, with some reference to the views of Croce: Miss Hilda D. Oakeley.

SOCIETY OF CHEMICAL INDUSTRY, at 8.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Communications in the Balkans H. C. Woods.

ROYAL SOCIETY OF ARTS, at 4.30.—National and Historic Buildings in the War Zone: Rev. Dr. G. H. West.

TUESDAY, FEBRUARY 8.

ROYAL INSTITUTION, at 3.—Nerve Tone and Posture: Prof. C. S. Sherrington.

ZOOLOGICAL SOCIETY, at 5.30.—A Collection of Moths made in Somaliland by Mr. W. Feather, with descriptions of new species by Sir G. F. Hampson and others: Prof. E. B. Poulton.—Report on the Deaths which occurred in the Zoological Gardens during 1915, together with a list of the Blood parasites found during the year: Prof. H. G. Plimmer.

INSTITUTION OF CIVIL ENGINEERS, at 5.30.—Notes on the working of a Rack Railway: W. T. Lucy.

WEDNESDAY, FEBRUARY 9.

ROYAL SOCIETY OF ARTS, at 4.30.—The Organisation of Scientific Research: Prof. J. A. Fleming.

THURSDAY, FEBRUARY 10.

ROYAL SOCIETY, at 4.30.—*Probable Papers:* The Theory of the Helmholtz Resonator: Lord Rayleigh.—The Oxhydrogen Flame Spectrum of Iron: Sir N. Lockyer and H. E. Goodson.—The Consumption of Carbon in the Electric Arc. II. The Anode Loss: W. G. Duffield and M. D. Wallace.—Surface Friction. Experiments with Steam and Water in Pipes: C. H. Lander.—The Structure of broadened Spectrum Lines: T. R. Merton.

ROYAL INSTITUTION, at 3.—Measurement of the Brightness of Stars; Visual and Photographic Magnitudes: Sir F. W. Dyson.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Testing of Underground Cables with Continuous Current: O. L. Record.

OPTICAL SOCIETY, at 8.—Optical or Visual Signalling: Dr. W. J. Ettles.

FRIDAY, FEBRUARY 11.

ROYAL INSTITUTION, at 5.30.—Egyptian Jewelry: Prof. W. M. Flinders Petrie.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Annual General Meeting.

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