August 17, Mr. R. G. Hatton, on the problem of the rural continuation school; and on August 18, Mr. W. G. W. Mitchell, on some new ideals in geometry teaching, and Miss Dewdney, on self-instruction in elementary arithmetic. The committee invites teachers conducting experiments in education to communicate with the secretary, 24 Royal Avenue, Chelsea, S.W.3.

AT the meeting of the London County Council Education Committee on July 11 the applications of the governing bodies of the London polytechnics for grants from the Council were considered. The committee decided to recommend that grants for the year 1917-18 only be made, as it was felt that in the circumstances of the present times it is impossible to forecast the position three years ahead. Eventually the following block grants for 1917–18 were decided upon: Battersea Polytechnic, 11,133*l.*; Birkbeck College, 7100*l.*; Borough Polytechnic, 9100*l.*; City of London College, 4040*l.*; Northampton Polytechnic, 4400*l.*; Northern Polytechnic, 9650*l.*; Regent Street Polytechnic, 14,300*l.*; Sir John Cass Technical Institute, 4000*l.*; South-Western Polytechnic, 7300*l.*; Woolwich Polytechnic, 9700*l.* A special grant of 1567*l.* was made to the governing body of Battersea Polytechnic for the establishment of a superannuation fund for the teachers in the secondary school.

WE have recently noticed with satisfaction the signs of an improved temper on the part of professed "humanists" with respect to the position to be accorded to natural and experimental science as an element in general education. The attention of our readers has been directed within the last few months to articles by writers so important as Mr. A. C. Benson and Lord Bryce. Now we have another even more sympathetic utterance from the Master of Balliol College, Oxford, who contributes to the *English Review* an expression of his views on "Natural Science in Education," beginning with the following words: "If there is one lesson more than another which the war is going to teach us, it will be the lesson as to the future place of natural science in our education." This is fairly obvious, and from one point of view almost a commonplace, for the majority of the public look to science merely for the sake of its practical application. It is not so much the invention of new flying machines or the discovery of new explosives that the world requires, but more exact knowledge in every direction. Science purifies common observation and teaches the nature and use of evidence. By science we learn something of the rules of the universe, and their control of the conditions under which human life exists. These rules cannot be ignored, and, as the writer remarks, "how powerless against them is even the best Parliamentary debating." Then there is the further and deeper influence which can only be justly expressed by the term "spiritual"—that effect of mingled awe and exultation which is produced when science opens out some profound vista of the universe. All the methods to be used in education require good teachers, and therein lies one of the difficulties of the time immediately ahead of us. The author touches on many of the questions concerning which debate is still going on, such as, for example, the already generally overloaded curriculum. While it is comforting to reflect that the best classical teachers admit that there has been a great deal of wasted drill in grammar and composition, it is the ignorance and apathy of the public which are to blame in having so long accepted without stronger remonstrance the purely bookish character of the system under which our boys and girls have been brought up.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 28.—Sir J. J. Thomson, president, in the chair.—Sir Robert **Hadfield**, Ch. **Chéneveau**, and Ch. **Géneau**: A contribution to the study of the magnetic properties of manganese and of some special manganese steels. (1) The research has had for its object the investigation of the mass-susceptibility of manganese metal, and of certain of its alloys with iron and other metals. The work was carried out on a Curie-Chéneveau magnetic balance. (2) Manganese itself, when free from occluded gases, is para-magnetic, its value of χ being $+11{\cdot}0\times10^{-6}\pm2$ per cent. This corresponds on Weiss's theory to a number of magnetons equal to 6. The removal of occluded gases is essential, as the ferro-magnetic properties of certain specimens of manganese are shown to be due to the presence of hydrogen. (3) The manganese alloys investigated, with one exception, are all para-magnetic, χ varying from $17{\cdot}0\times10^{-6}$ to $259{\cdot}0\times10^{-6}$. The exception mentioned is a silico-manganese steel containing 6 per cent. of silicon, which is distinctly ferro-magnetic. (4) An endeavour is also made to correlate the values of the mass-susceptibility with the composition of the alloys. In this connection it has been shown that the quantity of manganese within the limits investigated has very little influence upon the susceptibility, whilst increase of carbon tends to decrease it. In general it is concluded that in these special steels the susceptibility decreases as the carbon-manganese ratio increases. (5) The carbon-manganese ratio being constant, addition of chromium, nickel, or tungsten raises the susceptibility. (6) The addition of copper to a manganese-nickel steel also raises the susceptibility—this notwithstanding the diamagnetism of copper.—W. R. **Bousfield**: Note on the specific heat of water. Replying to criticisms by Callendar (Bakerian Lecture, Phil. Trans., A, 212, p. 1, 1912) on the methods for investigating the specific heat of water described in a former paper (W. R. Bousfield and W. Eric Bousfield, Phil. Trans., A, 211, p. 199, 1911), it is pointed out that the observations of Callendar do not substantially affect the question as to which figures are more correct in the lower range of temperature from 0° to 40° or 50° C. Callendar and Barnes differ from other observers in placing the minimum value for the specific heat of water in the neighbourhood of 40° C., whilst other observers put it at about 25° C.—W. R. **Bousfield** and C. Elspeth **Bousfield**: The specific heat of aqueous solutions with special reference to sodium and potassium chlorides. The specific heats of solutions of NaCl and KCl ranging from saturated solutions to quarter-normal solutions at mean temperatures of 7°, 20°, and 33° C. have been determined by the method and apparatus used for the determination of the specific heat of water and described in a former paper (Phil. Trans., A, 211, p. 199, 1911). The corresponding densities have also been determined. The relation of the specific heat of the solution to the specific contraction of the water is studied, and it is shown that the specific heat of a series of solutions of different concentrations may be reckoned on the hypothesis that the specific heat of the solute is constant, whilst the mean specific heat lowering of the water is proportional to the specific contraction of the water. The temperature variations of the specific heats of the solutions are also compared with the temperature variations of the specific heat of water. The minimum value on the temperature-specific heat curve, which occurs at about 25° C. in the case of water, disappears altogether in solutions of half-normal to normal strength. This curve for the most concentrated solutions becomes a straight line.—

Sir George **Greenhill**: The Rankine trochoidal wave. The Rankine trochoidal wave (Phil. Trans., 1863), either as rollers or as a starting wave, can be divided up by vertical planes perpendicular to the wave crest into compartments, and the compartments sheared along each other. The investigation is made of the extra field of force in addition to gravity when the shear is made continuous and the planes removed in order that the continuity of pressure should be preserved in the interior of the water, and for the new wave motion to persist. Also when the planes stand over to the vertical and the circular orbits in the roller are in parallel planes. A geometrical investigation is added of the molecular rotation in the interior of the Rankine wave.—Dr. P. E. **Shaw**: The tribo-electric series. (1) The tribo-electric series, in which solid materials are arranged in order according to the charge they acquire when rubbed together, is trustworthy with due precautions. (2) Most solids are found to alter their place in the series if heated above a certain temperature which is specific for each material. This temperature is called the critical temperature. The surface in its new condition is termed abnormal. (3) The series may be divided into an upper Group A and a lower Group B. It is found that these groups have tendencies contrary to one another as the surfaces of the materials are rendered (*a*) matte, or (*b*) abnormal, or (*c*) pressed, or (*d*) flexed. If under any of these agencies Group A becomes more + forming, Group B becomes more − forming, and *vice versa*. (4) Anomalous effects are observed when liquid mercury is used as one of the materials, its behaviour being quite unlike that of solid surfaces. (5) As to theory, it is suggested that the prevalent idea that the electric double-layer existing at the surface of solids has the − layer outermost in all cases is incorrect. Normally the materials in Group A would have − outermost, those in Group B having + outermost. Orientation of surface atoms would give rise to changes in the disposition of the two electric layers and so account for observed effects. (6) Tribo-electricity undoubtedly affords a means, of extraordinary delicacy, of discriminating between materials apparently alike. Two instances are seen in the group of furs and the group of woods.—J. J. **Nolan**: The nature of the ions produced by the spraying of water. Part i. gives an account of the determination of the mobilities of the very mobile ions produced by the spraying of water. Groups of ions are found, positive and negative, some of very high mobility. In part ii. the less mobile ions described in a previous paper are discussed. Treating the ions as minute spheres of water, it is shown that their sizes as deduced from an empirical modification of Stokes's law would agree with the sizes calculated from the ordinary theoretical mobility formulæ. Certain evidence, however, tends to show that the larger of these ions are not simple spheres of water, but that they consist of loose groupings of various numbers of some smaller water-globules. In part iii. it is shown that the very mobile ions can be accounted for by supposing that they consist of aggregates of various numbers of water-molecules, the numbers of molecules in the various ions being related to one another in a regular way. Some of these ions have the same mobility as ions produced in air by X-rays, etc. It is suggested that the ordinary gaseous ion consists of a group of water-molecules, the size of the group depending on the degree of moisture of the gas.—Prof. J. C. **McLennan**: The absorption spectra and the ionisation potentials of calcium, strontium, and barium.—J. **Small**: Geotropism and the Weber-Fechner law.—Prof. W. B. **Bottomley**: The isolation from peat of certain nucleic acid derivatives.

BOOKS RECEIVED.

Spiritualism and Sir Oliver Lodge. By Dr. C. A. Mercier. Pp. xi+132. (London: Mental Culture Enterprise.) 4*s*. 6*d*. net.

A Manual of Field Astronomy. By A. H. Holt. Pp. x+128. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 6*s*. net.

Laboratory Manual of Bituminous Materials for the Use of Students in Highway Engineering. By Prévost Hubbard. Pp. xi+153. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 6*s*. net.

The Fundus Oculi of Birds, especially as Viewed by the Ophthalmoscope. By Casey Albert Wood. Pp. 180+plates lxi. (Chicago: The Lakeside Press.)

Fifty-fifth Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan and Twenty-ninth Annual Report of the Experiment Station from June 1, 1915–June 30, 1916. Pp. 896. (Lansing, Mich.: Wynkoop Hallenbeck Crawford Co.)

Critique des Propulseurs. Par Paul Popovatz. Pp. 131. (Paris: Gauthier-Villars et Cie.)

Science and Industry. The Place of Cambridge in any Scheme for their Combination. The Rede Lecture, 1917. By Sir R. T. Glazebrook. Pp. 51. (Cambridge: At the University Press.) 1*s*. 6*d*. net.

The National University of Ireland. Calendar for the Year 1917. Pp. viii+579. (Dublin: A. Thom and Co., Ltd.)

The Biology of Waterworks. By R. Kirkpatrick. (Economic Series, No. 7.) Pp. vi+58. (London: British Museum, Natural History.)

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