Board of Education as eligible for grant during 1916–17 was 931, and in them there were 198,759 pupils, of whom 103,819 were boys, as compared with 189,487 pupils, of whom 99,205 were boys in the same number of schools during 1915–16. In addition to the 931 schools on the grant list, the Board recognised 125 other schools as efficient, and in these schools, during 1914–15, 25,033 pupils were being educated. Though the numbers for 1916–17 are not available, the report says it is probable that the number of pupils in these efficient schools increased, on the whole, in about the same proportion as in the schools on the grant list. The Board of Education has found that the withdrawal from the schools of the younger and more vigorous masters, and their replacement by others of lower physique, of more advanced years, and often of inferior qualification, is an educational loss for which there can be no effective compensation. The effect of increased entry and enforced stoppage of building has been to cause serious overcrowding, which, unfortunately, must for the present be regarded as inevitable.

IN his presidential address to the Society of British Gas Industries, Sir Robert Hadfield devoted one section to a consideration of the world's facilities for higher education. According to his investigations, there are about 280 universities in the world, with some 500 "special colleges" and 100 technical schools, staffed by about 53,000 trained teachers and investigators. Excluding India, the white population of the British Empire is about 65 millions, served by 48 universities, which gives one university for each $1\frac{1}{4}$ millions of population. In Great Britain and Ireland, with a population of some 45 millions, there are 18 universities, which works out at one university for each $2\frac{1}{2}$ millions of population. In Canada, Australasia, and South Africa, where the population is distributed over very much larger areas, the proportion is naturally higher, and is about one university for each two-thirds of a million population. In France and Italy the proportion is just about the same as in Great Britain and Ireland. As regards Germany, if the technical high schools of university rank are grouped with the universities, the proportion is one per two millions of the inhabitants. In Austria-Hungary the proportion is about one per $4\frac{1}{2}$ millions, and in Russia it is only one per 14 millions of population. The country which contains the largest number of universities, both absolutely and in proportion to population, is the United States of America, where one university exists for each million of inhabitants. Sir Robert Hadfield gives an interesting table showing the chief subjects dealt with in universities and technical schools, and the number of universities at which each subject is taught.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 16.—Sir J. J. Thomson, president, in the chair.—A. **Mallock**: Note on certain coloured interference bands and the colours of tempered steel. After alluding to the interference bands seen when two rows of posts, etc., or two gratings, are viewed one through the other, the paper deals with a particular case of such bands, namely, that when a plate of dispersive material, such as glass, is placed between the two gratings, or, which amounts to the same thing, when a single grating is placed on a thick mirror, and the interference takes place between the grating and its reflective image. The bands so formed are coloured. The composition of the colours in terms of primary red, green, and violet is given diagrammatically by means of Maxwell's chromatic triangle for nine examples. It is noticed that the sequence of colours in some of these agrees closely with those of tempered steel. It is shown that the colours of tempered steel are not "colours of thin plates," and it is suggested that they must be due to the formation of some material the molecular period of which is comparable with the period of light-waves, and not to a structure comparable with the wave-length.—J. C. M. **Garnett**: General factors in mental measurements. An inquiry into the mathematical argument for the existence of Prof. Spearman's general factor g, in all mental abilities of which measurements had been published during many years, led to an investigation into the consequences that must follow from the condition that the correlation between every pair of columns in a correlation table is ± 1. These consequences were found to be that there is one, and only one, factor common to all the qualities the correlations of which form the table; that there are no group factors common to two or more qualities but not to all; and that there may be any number of specific factors each belonging to one quality only. It was found that any quality which is distributed according to the normal law, and depends only on n independent factors (qualities), say $x_1 x_2 \ldots x_n$, which are distributed according to the normal law and have the same standard deviation, may be represented by

$$q = l_1 x_1 + l_2 x_2 + \ldots + l_n x_n$$

where

$$l_1^2 + l_2^2 + \ldots l_n^2 = 1.$$

The standard deviation of q, moreover, will be the same as of $x_1 x_2 \ldots x_n$. The existence is indicated of a third general factor c ("cleverness") independent both of Prof. Spearman's g ("general ability") and of Dr. Webb's w ("purpose"). How much would be known concerning the mental qualities of an individual whose g, w, and c had been measured is discussed in concluding the paper.—C. M. **Williams**: The absorption of X-rays in copper and aluminium. The paper deals with the relation between the mass absorption coefficients of X-rays in copper and aluminium and the respective wave-lengths over a range of 0·431–0·637 A.U. The relation between the two absorption coefficients are examined and the dependence of each of the latter on the wave-length. A notable feature is the occurrence of discontinuities in the curves representing the results; these may probably be connected with the J-series recently described by Barkla. With respect to the approximate relation between the mass absorption coefficient μ/ρ and the wave-length λ given by the equation $\mu/\rho = a\lambda^n + C$, where a, n, and C are constants, it appears that, while the relation is fairly well satisfied in the case of copper by giving n the value 5/2—a result in conformity with Owen's 5th-power absorption law—the results for aluminium show a value $n = 3$.—Dr. T. R. **Merton**: The electrical resolution and broadening of helium lines. (1) The broadening of helium lines by condensed spark discharges is in close agreement with the electrical resolution of the lines. (2) The "isolated components" in the electrical resolution which have been recorded by Brunetti, and by Takamine and Yoshida, have been found in the broadened lines. (3) An explanation is offered of the relative degree of broadening of lines of the "arc" and "spark" type, on the supposition that the latter act as a kind of safety valve to the former when the intensity of excitation becomes very great. (4) It is suggested that the "isolated components" are not a

direct product of the electrical resolution, but are in reality an extension of the helium spectrum. Two of these lines may, perhaps, be represented as lines of combination series.

PARIS.

Academy of Sciences, May 21.—M. Léon Guignard in the chair.—P. **Termier**: Contribution to the knowledge of the tectonic of the Asturias.—C. **de la Vallée Poussin**: The best approximation of the functions of a real variable by expressions of given order.—E. **Aries**: The saturated vapour pressures of tetratomic bodies. The method described in earlier papers is applied to the cases of ammonia, acetylene, and phosphorus trichloride. From the experimental data available a full comparison is only possible in the case of ammonia, and for this the agreement between the experimental and calculated values is very satisfactory.—J. **Pérès**: Some remarks on certain developments in series.—A. **Buhl**: The series of Taylorian polynominals and Weierstrass domains.—M. **Luizet**: Observations of the brightness of Nova Licorne.—A. **Véronnet**: The cooling and evolution of the sun.—C. **Matignon**: Ferro-silicons not attacked by acids. Analyses are given of six ferro-silicons and one ferro-boron and the loss on treatment with four acid solutions, two of nitric acid and two of mixtures of acetic and butyric acids, studied. The comparative losses under similar conditions are tabulated.—MM. **Masson** and **Faucon**: The absorption of ultra-violet radiations by the phenylmethanes. Details of measurements are given for benzene, toluene, diphenylmethane, and triphenylmethane.—Ed. **Chauvenet** and Mlle. L. **Nicole**: The basic nitrates of zirconyl.—D. **Berthelot** and R. **Trannoy**: The sugar content of *Sorghum saccharatum* at different stages of growth. The results of analyses of juice taken on eight dates between August 10 and November 30 show a maximum sugar content about October 5. It is shown that the richness in sugar can be calculated from the density of the juice.—L. **Cavel**: The antiseptic value of some essential oils. The experiments were carried out on diluted sewage, and the amounts of essential oil determined stopping all bacterial growth. Results are given for forty-five essences, phenol being used as a standard of comparison. Two-thirds of the essential oil examined proved to be stronger antiseptics than phenol, oil of thyme being the most powerful.—M. **Folley**: The aorta in exophthalmic goitre.

BOOKS RECEIVED.

The British Academy. Cosmic Law in Ancient Thought. By T. W. Rhys-Davids. Pp. 11. (London: H. Milford.) 1*s*. net.

Italian Mountain Geology. By C. S. DuRiche Preller. 2 parts. Part i., pp. 99; part ii., pp. 107 to 192. (London: Dulau and Co., Ltd.)

The Art of Health. By J. Long. Pp. xi+192. (London: Chapman and Hall, Ltd.) 5*s*. net.

An Introduction to the History of Science. By Prof. W. Libby. Pp. x+288. (London: G. G. Harrap and Co., Ltd.) 5*s*. net.

Acoustics for Musicians. By Prof. P. C. Buck. Pp. 152. (Oxford: Clarendon Press.) 7*s*. 6*d*. net.

DIARY OF SOCIETIES.

THURSDAY, JUNE 6.

ROYAL SOCIETY, at 4.30.—Brevity, Frequence of Rhythm and Amount of Reflex Nervous Discharge as Indicated by Reflex Contraction: N. B. Dreyer and Prof. C. S. Sherrington.

ROYAL INSTITUTION, at 3.—The Abode of Snow; Its Appearance, Inhabitants, and History: Sir F. Younghusband.

LINNEAN SOCIETY, at 4.30.—A Revision of Some Critical Species of Echium [Viper's Bugloss], as Exemplified in the Linnean and other Herbaria, with a Description of *Echium judaicum*, a New Species from Palestine: C. C. Lacaita.—Experiments with Cyclamen: Capt. A. W. Hill.—The Relationship between the Symbionts in a Lichen: R. Paulson and S. Hastings.—Abnormal Apple-blossoms and Fruit: W. C. Worsdell.

FRIDAY, JUNE 7.

ROYAL INSTITUTION, at 5.30.—The Romance of Petroleum: Sir B. Redwood.

SATURDAY, JUNE 8.

ROYAL INSTITUTION, at 3.—Problems in Bird-migration: Prof. C. J. Patten.

MONDAY, JUNE 10.

ARISTOTELIAN SOCIETY, at 8.—The Ontological Argument for the Existence of God: Prof. A. A. Cock.

ROYAL GEOGRAPHICAL SOCIETY, at 8.—The Backbone of Africa: Sir Alfred Sharpe.

SOCIETY OF ENGINEERS, at 5.30.—War on and under the Sea: Edwin Hall.

TUESDAY, JUNE 11.

ZOOLOGICAL SOCIETY, at 5.30.—On Two New Elasmobranch Fishes from the Upper Jurassic Lithographic Stone of Bavaria: Dr. A. Smith Woodward.—The Function of Pathology in Evolution: Morley Roberts.

WEDNESDAY, JUNE 12.

BRITISH ASSOCIATION GEOPHYSICAL COMMITTEE (Royal Astronomical Society), at 5.—*Discussion:* The Tides. Opener, Prof. H. Lamb, followed by Prof. Love, Mr. Proudman, and others.

THURSDAY, JUNE 13.

OPTICAL SOCIETY, at 7.—The Prevention of Filming in Enclosed Optical Instruments: H. S. Ryland.—A Chart for Finding the Number of Lenses in, and Size of, a Block: Horace Lee.—Charts for Assisting in the Selection of Suitable Glasses for Cemented Doublets: T. Smith.

FRIDAY, JUNE 14.

ROYAL ASTRONOMICAL SOCIETY, at 5.

PHYSICAL SOCIETY, at 5.—*Discussion:* The Teaching of Physics in Schools: Opener, Sir Oliver J. Lodge.

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