

was agreed that a resolution on the policy of the society should be circularised among the members for consideration before the next meeting, which is to be held in Sheffield on June 19. Before the meeting the members enjoyed a visit to Messrs. Ediswan, Ltd., at Ponders End.

THE ROYAL OBSERVATORY, GREENWICH.

THE report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, was read at the annual visitation of the Observatory on Saturday, June 1. The subjoined extracts are from the report.

Greenwich Catalogue.

Advantage is being taken of the delay in the printing of the Greenwich catalogue of 12,000 stars for 1910 to insert the type of spectrum as well as the magnitude of the star on the Harvard scale. This has been made possible by the kindness of Prof. Pickering, who is supplying, partly in manuscript and partly in early proofs, the results of Miss Cannon's survey at Harvard College. Discussions of some points connected with the proper motions of the stars in this catalogue have been communicated to the Royal Astronomical Society, and others are in progress.

Heliographic Observations.

In the year ended May 10, 1918, photographs of the sun were obtained on 209 days. The transmission to England of the solar photographs taken at the Royal Observatory, Cape of Good Hope, has been suspended for the present, the last originals received being those for February, 1917, and the last duplicates those for the month previous. Similarly, no application has been yet made for photographs taken at the Indian observatories of Kodaikanal and Dehra Dûn to fill up gaps in the combined Greenwich-Cape record. The days in 1917 left without representation in the combined record are only nine in number, and for eight of these days photographs taken at Kodaikanal are available; the only date in 1917 still without a photograph being March 12.

H.M. Astronomer at the Cape has reported that the sun was successfully photographed there on 333 days in the year 1917, and on every day in January, 1918. The director of the Kodaikanal Observatory has reported that the regular series of photographs of the sun was recommenced there on April 1, 1917, and that plates were taken on 248 days out of the 275 of the nine remaining months of the year.

During the whole of the period covered by this report the spot-activity has been considerable, but it reached a remarkable development during August, 1917, the mean daily spotted area during the second week of that month being the highest as yet registered in the Greenwich photographic record. No disturbance comparable with this has occurred since, but considerable secondary maxima, with total spotted areas of more than 1000 millionths of the sun's visible hemisphere, were observed in September and December, 1917, and in February and March, 1918.

Magnetic Observations.

The mean values of the magnetic elements for 1917 and three previous years are as follows:—

	Dec. W.	Hor. force	Vert. force	Dip
1914 ...	15 6.3	0.18518	0.43317	66° 51.2
1915 ...	14 56.5	0.18508	0.43315	51.8
1916 ...	46.9	0.18494	0.43313	52.7
1917 ...	37.0	0.18477	0.43305	53.6

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The annual diminution of declination increased considerably about 1910, its average value from 1900 to 1910 being 4.9'. The horizontal force, which had been increasing since measurements were begun at Greenwich in 1846, reached a maximum about 1910, and is now diminishing. The dip, which has been diminishing since measurements were begun in 1843, reached a minimum about 1913, and is now increasing.

There were no days of great magnetic disturbance in 1917, but four were classified as of lesser disturbance. Traces of the photographic curves for these days will be published in the annual volume.

Meteorological Observations.

The following details of the weather refer to the year ended April 30, 1918. The mean temperature was 50.0°, or 0.4° above the average of the seventy-five years, 1841-1915. The highest temperature in the shade was 93.2° on June 17, and the temperature exceeded 80° on fifteen days. The lowest temperature was 17.2° on December 19, and on fifty-three days fell as low as 32.0°.

The mean daily horizontal movement of the air was 298 miles, which is fourteen miles above the average of the previous fifty years. The greatest daily movement, 767 miles, was recorded on November 24, and the least, forty-seven miles, on December 20. The greatest recorded pressure on the square foot was 18.8 lb., on October 25; the greatest velocity in one hour, forty-six miles, was registered on the same day.

The duration of bright sunshine registered by the Campbell-Stokes instrument was 1668 hours out of a possible 4456 hours, or 36.1 per cent. January provided more and April less than any corresponding month since the present instrument was set up in 1897.

The rainfall was 28.06 in., or 3.82 in. above the average for the period 1841-1915. The number of rainy days (0.005 in. or over) was 156. March, with 0.97 in., was the driest, and August, with 4.56 in., the wettest month.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

By the will of Dr. E. A. Letts, professor of chemistry in Queen's University, Belfast, who died in February last, his collection of minerals is bequeathed to Queen's University, and, on the death of his wife, 2100*l.* for the endowment of a scholarship in the University.

MR. JOHN OWENS, of Chester, has been authorised by certain friends to offer the University of Wales on their behalf 10,000*l.* war stock towards the establishment of a music directorship on the lines indicated in the report of the Royal Commission on University Education in Wales.

THE Education Bill and eugenics is the subject of an article by Mr. Wm. C. Marshall in the *Eugenics Review* for April (vol. x., No. 1). Mr. Marshall believes that the Bill bids fair, if loyally carried out, to satisfy the requirements of the intelligent artisan, and to assure him that he can in the future count on obtaining for any of his children, inheriting his qualities and reared under his care and supervision, an education which will assure their position in the industrial world. On these grounds the conclusion is that the Bill should be cordially welcomed by eugenists.

INTERESTING and instructive statistics concerning the growth of secondary education in England and Wales are contained in the Report of the Board of Education for the year 1916-17 (Cd. 9045). The total number of secondary schools in England regarded by the

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 $1\frac{1}{2}$ 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, \dots, x_n , which are distributed according to the normal law and have the same standard deviation, may be represented by

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

where

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

The standard deviation of *q*, moreover, will be the same as of x_1, x_2, \dots, 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