

to fatigue has been brought to my notice. According to Ferree's observations, either a yellow or a blue tint is more fatiguing than a white light. The difficulty of a satisfactory test for fatigue of the visual mechanism arises here, and we have to deal with a very complicated set of factors. Many of the tests used seem to indicate muscular fatigue either of the extrinsic eye muscles or of the mechanism of accommodation. Moreover, the large question of general fatigue is involved. Tests such as those used by Dr. Stanley Kent would give valuable information as to the effects of various systems of illumination, and especially as to what are to be regarded as defective. It may be pointed out that the present conditions are unusually favourable to investigations of this kind in factories under Government control. An equally important series of questions has been raised by Mr. Gaster, namely, the effect on school children with normal and with imperfect vision of working in adequate light. Data on all these points would be of great value.

Whatever may be the precise results obtained from such investigations, there can be no doubt that children should not be compelled to do their home-work in bad lighting conditions, however necessary it may be to effect a saving in the consumption of gas and electric current. A more widely spread diffusion of information as to ways in which saving may be effected without injurious results is much to be desired.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—A memorandum emphasising the urgency of making formal provision for the encouragement of the study of geodesy and geodynamics in the University, and recommending the early establishment of a readership in these subjects if a suitable endowment can be obtained, has been submitted by the Special Board for Mathematics to the General Board of Studies. The latter has reported that it fully concurs in the importance of the early establishment of such a readership. In its memorandum the Special Board gives reasons why special provision and formal recognition for geodesy and geodynamics is particularly called for at the present time in the University. The progress on the theoretical side of the science of the figure of the earth has been promoted in the past very largely by investigators belonging to Cambridge in connection with the scientific problems presented both by the British and by the Indian Surveys, trigonometrical and gravitational. More recently the interconnection of the Surveys of different nations has made the subject an international one, and for the last twenty years the headquarters of the International Geodetic Association, supported by subventions from the various Governments, has been at Potsdam. Reconstruction is called for in the near future, and this country ought to be in a position to resume a large share in the direction. The establishment of a British Imperial Geodetic Institute, with State endowment, is now being urged by responsible scientific bodies, and some institution of the kind will be necessary. Whatever arrangements may be made on the technical and administrative side, the theoretical side, which is the foundation of all progress, is a subject of pure mathematical and dynamical science, and can best be advanced by the universities. In order for Cambridge to retain her historical position in the advance of this important science, and to take part in the training of the men who will be required for its prosecution, some special provision and formal recognition for the subject are called for under modern conditions.

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OXFORD.—On June 8 a numerous company assembled in the Sheldonian Theatre to hear Mr. Asquith deliver his Romanes lecture on the Victorian age. The chair was occupied by Lord Curzon of Kedleston, Chancellor of the University, who took occasion to denounce "the gross and gratuitous defamation of the character of our public men." Mr. Asquith, after speaking of the financial and commercial activity which formed one of the chief characteristics of the Victorian age, and the prominence of the novel among the literary productions of the time, went on to offer a brief appreciation of the most famous names in the period under review. Towards the end of his discourse he touched upon the great scientific movements initiated by Victorian chemists, physicists, and biologists, selecting for special mention Faraday, Kelvin, and Darwin. Disclaiming all qualification to speak as an expert, or to hold the balance between antagonistic views as to the method of evolution, he nevertheless paid tribute to the spirit of single-minded investigation manifested by Darwin and to the unselfish and generous manner in which Wallace had minimised his own merits as a co-discoverer with Darwin of the principle of natural selection. The celebrated retort by Huxley upon the ill-judged attack of Bishop Wilberforce was once more related before an Oxford audience, and Mr. Asquith ended by declaring his own conviction that, whatever man's physical pedigree, he had reached a stage in development which raised him into an essentially different category from that of other living beings, and endowed him with qualities which could only be appreciated and expressed by "the poet who had the gift of vision."

On June 11, the anniversary of the burial of Roger Bacon within the precincts of the Grey Friars at Oxford, the first visitation took place of the memorial tablet which was affixed to the city wall in October, 1917.

MR. P. L. BERNSTEIN, of the Municipal College of Technology, Manchester, has been appointed lecturer in electrical engineering at the Hull Technical College.

A HOLIDAY course in psychology, arranged for teachers and others, is to be held at Bedford College for Women, Regent's Park, from August 1 to 10 inclusive. It will include lectures on psychological topics, and afford opportunities for individual laboratory work. Particulars are obtainable from the Principal of the College.

Two Chadwick public lectures on "Our Fisheries and the Food Supply" will be delivered in London by Prof. D'Arcy Wentworth Thompson on June 21 and 28, at 5 p.m. The first lecture, on "The Catch by Line and Trawl," will be given at the Mansion House, and the second, on "The Catch by Net, or the Great Herring Fishery," at the Surveyors' Institution, Westminster. Admission will be free. Further particulars of these and other Chadwick public lectures may be obtained of the Secretary at the offices of the Trust, 40 (6th) Queen Anne's Chambers, Westminster.

THE serious shortage in the supply of teachers for elementary schools is again dealt with in the Report of the Board of Education for the year 1916-17 (Cd. 9045), which is now available. The total number of boys and girls beginning in 1917 to train for the career of teaching was 6158, as compared with 6544 in 1916, and 9614 in 1908. From 1908 there was a steady decline down to 1912 in the number of entrants, when it had fallen to 5232. This was followed by a period of recovery, the number reaching 7047 in 1915, since which date it has steadily fallen again. The imme-

diate cause of the decline which has again set in is to be looked for in the war, though, as the report points out, the end of the war cannot of itself be expected to remedy the evil. A specially serious feature of the present situation is that the progressive decline now going on comes at the end of a series of years, during which the number of entrants has been altogether insufficient for the needs of the country. The report states emphatically that there is no hope of meeting this shortage except by a substantial increase in the salaries of adult teachers and by a general improvement in the prospects of the teaching profession. There is little hope at present of securing an increase in the length of the school-life of elementary-school pupils or of reducing the size of classes—two measures of crying importance—because both improvements depend upon an increased supply of teachers.

An interesting and suggestive address on "A Londoner's Opportunity in Commerce," under the auspices of the Education Committee of the London County Council, was recently delivered in the Kingsway Hall to the students of the educational institutions in London by the Minister of Labour, the Rt. Hon. G. H. Roberts. The address dealt with the much-increased facilities now offered in London for the due education and training of those engaged in commerce, and it appeared that there were now in attendance as many as 100,000 students in fifty-nine senior and ninety-eight junior institutes. The Minister pleaded that full opportunity of a generous education based upon liberal lines should be available for all the children of the nation. Talent was widely diffused, and was centred in no particular stratum of society. The future abides with those peoples whose standard of education, both technical and moral, is of the highest order. The State must devise some means of ensuring that no child is wasted. Scientific training, not only vocational, but to fit the child for his full duties as a citizen, was indispensable if the nation is to be in a position to meet successfully the crucial problems and the severe competition which will inevitably arise at the close of the war. There must be a closer union and identification of interests between employer and employed and of Government departments concerned with the problems of labour and education, since the one reacts upon the other. If this be ensured, along with the diffusion of education amongst all classes of the community, the future of the country will give no cause for anxiety, since the British people, with their great traditions, and keen to exercise their great qualities, need not fear the rivalry of any existing race in the world. Out of the horrible evil which the war has brought in its train some good has at least arisen, since it has awakened our people to the value of education and to the necessity for measures to give it full and fruitful effect.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society**, May 30.—Sir J. J. Thomson, president, in the chair.—Prof. J. Joly: Method of avoiding collision at sea. The method of avoiding collision at sea now proposed involves the determination of distance between ship and ship at regulated intervals by means of synchronised signals (preferably wireless and submarine). The principle involved is that ships which are advancing so as to collide approach one another with constant velocity, *i.e.* the relative velocity is constant. If they are going to pass clear the relative velocity is not constant, diminishing to nothing when the vessels are at the passing distance, and then

changing sign. The paper embodies tables and curves showing the variations of relative velocity for different passing distances. Assuming that a quarter of a sea-mile is distinguishable by the use of synchronised signals, the method appears to be certainly available for a passing distance of half a mile. Mechanical aids towards increasing the trustworthiness of observations and facilitating them are described. The advantages of the method are chiefly that it involves no special inter-communication between ship and ship (other than the regulated synchronised signal supposed to be emitted by all vessels navigating in fog or thick weather), and that the distance separating the vessels is necessarily kept under observation throughout.—Dr. R. A. Houston: A statistical survey of colour vision. The colour vision of seventy-nine students was tested by the method of Dr. Edridge-Green's colour-perception spectrometer. Three of the seventy-nine were found to be colour-blind. The number of observers containing a given number of patches was plotted against the latter, and a frequency curve obtained. If the Young-Helmholtz theory is true, this curve should have two maxima, one for normal colour vision and one for dichromatism. The results show, however, that normal colour vision has quite enough "scatter" to explain colour blindness as an outlying portion of itself, and that it is not necessary to assume the existence of a separate maximum. Various points of interest in connection with the observations are discussed, and it is suggested that a more extensive survey made on similar lines at different places might settle definitely once for all the vexed question of colour-vision theory.—Dr. A. E. Everest: The production of anthocyanins and anthocyanidins. Part iii. The paper is a continuation of the author's previous work, and deals with the mode of formation, in Nature, of the anthocyanin pigments. Available data concerning the co-existence of anthocyanins and flavonol derivatives are discussed, and preliminary experiments with a view to the elucidation of the manner in which the anthocyanin pigments are formed in plants are described. For the first time direct chemical evidence is recorded which supports the prevailing view that the anthocyanin pigments are produced in Nature *via* flavonol derivatives, it being shown, with a very considerable degree of certainty, that in the flowers examined (purple-black viola) the anthocyanin pigment exists side by side with a glucoside of the flavonol derivative, from which the anthocyanin would be produced by reduction. The isolation, from the purple-black viola (Sutton's "Black Knight") of a pigment identical with Willstätter's violanin, and experiments to show the presence of a myricetin glucoside in the same flower, are described.

**Physical Society**, May 10.—Prof. C. H. Lees, president, in the chair.—Dr. S. Chapman: The times of sudden commencement of magnetic storms. The paper is a discussion from a new view-point of the data, collected by Dr. Bauer, for fifteen magnetic storms. Maunder's work on the recurrence of magnetic storms at intervals equal to the rotation period of the sun suggests that storms are due to some solar agent transmitted along narrow, well-defined streams issuing from and rotating with the sun. This suggests the view that the relative time of commencement of a storm at different stations depends mainly on the orientation of the latter at the time relative to the sun, *i.e.* on the local time at the station. This forms the basis of the classification in the paper.—Dr. H. S. Allen: The entropy of a metal. An expression for the entropy of one gram atom of a substance in the solid state has been given by Ratnowsky. In a communication to the Physical Society in 1916 the author gave the correct form of the approximation required for high