

tubes of electric displacement has been developed by Prof. J. J. Thomson, who draws attention to their strong analogies to tubes of vortex motion ("Recent Researches . . .," 1893, p. 52).

Prof. Oliver Lodge has kindly looked for an effect of a magnetic field on the velocity of light, but has not been able to detect any, though the means he employed were extremely searching; the inference would follow, on this theory, that the motion in a magnetic field is very slow, and the density of the medium correspondingly great.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The lectures announced by the various departments of Natural Science are for the most part a continuation of the courses given during the last term. In all, thirty-two separate courses of lectures are announced, nine in Physics, eight in Chemistry, two in Geology, four in Animal Morphology, four in Physiology, two in Botany, and three in Anthropology. The Hope Professor of Zoology, Mr. E. B. Poulton, is absent from Oxford this term, and the charge of the collection devolves on his assistant. In addition, Mr. Hatchett Jackson has consented to give any information that may be required respecting the Hope Collections.

The next examination for admission to a Radcliffe Travelling Fellowship will be held on March 1. Candidates are required to have obtained a first class in one of the honour schools, or to have gained an open University prize or scholarship, and to undertake a course of medical study with the view of proceeding to a medical degree.

CAMBRIDGE.—Mr. J. E. Purvis, of St. John's College, has been appointed Assistant to the Professor of Chemistry in the room of Mr. H. Robinson, who died on January 4. Mr. Robinson had held his office for sixteen years, and had, with Prof. Liveing and independently, conducted a number of important researches. Those on lathanum and didymium, and on certain points in bacteriological chemistry deserved greater notice than they received. Mr. Robinson's work in agricultural chemistry, in which he was an expert, will be carried on by Mr. T. B. Wood, of Caius College. Dr. Lorrain-Smith and Dr. Westbrook, John Lucas Walker Students in Pathology, will this term conduct, in Prof. Roy's laboratory, a new course of instruction in pathological chemistry. The lectures will be given on Mondays and Saturdays at noon, beginning on January 20. Mr. H. Yule Oldham, University Lecturer in Geography, will resume his lectures in physical geography on Thursdays at noon in the lecture theatre of the chemical laboratory; and will give informal instruction and assistance to students of geography in King's College on the same days at six o'clock. The election to the £100 studentship, offered by the Council of the Royal Geographical Society for members of the University attending the lectures, will be held on March 12.

AN influential deputation, representing the University Colleges of Wales, waited upon the Chancellor of the Exchequer on Friday last, to ask for an annual grant of £3,000 to the new Welsh University. In reply, Sir W. Harcourt said he would request the Government to grant the request for the present year, but he could promise nothing for the future.

SCIENTIFIC SERIALS.

Bulletin de l'Académie Royale de Belgique.—Stas's determinations of atomic weights, by E. Vogel. In spite of Stas's conclusion that the atomic weights of the elements have no common measure, Prout's hypothesis has recently been regaining ground. Hinrichs's experiments have thrown doubt upon Stas's atomic weight determinations; and the suppositions made by Stas himself place it beyond doubt that all his atomic weights without exception are inaccurate. The cause of the great discrepancies in the values found by Stas himself lies in the variation of the weights of the substances taken. When to a solution of an alkaline chloride is added nitrate of silver to slight excess, a precipitate will be formed on adding more chloride. But experiment shows that a precipitate is also formed on adding more nitrate, up to a certain limit which

Mulder termed the limit of silver, as distinguished from the limit of salt for the addition of the chloride. The author shows that the true atomic weight cannot be derived from the mean between these two limits, and proves from Stas's own data that they may be equally well interpreted for entire as for fractional multiples of the atomic weight of hydrogen.—Chronometric determinations relating to the regeneration of nerves, by C. Vanlair. The experiments, conducted by the physiological method, were made upon a motor nerve, the facial, a nerve whose simultaneous bilateral section is inconsistent with life, the pneumogastric, and a mixed sensory nerve, the sciatic. The right facial nerve of an adult rabbit, the two inferior branches of which were cut as they emerged from the parotid, required eight months for their regeneration. The right pneumogastric of an adult dog was cut in June 1889, and the left, one year afterwards. In August, 1891, the right nerve was cut again, but, after some initial troubles, the dog's health remained perfect throughout. Since the simultaneous section of the two branches is invariably fatal, it follows that during the time intervening between the sections the branch last cut must have reunited. This gives a velocity of reproduction of 3 c.m. per month, or 1 mm. per day. In the dog, and doubtless also in man, nervous regeneration, undisturbed by any accidental obstacle, takes place with an almost perfect chronological regularity. The average time necessary for initial proliferation is about forty days. For a section of about 1 c.m. length, the development of the new fibres takes place at a rate of 0.25 mm per day. The speed is greater at 2 c.m. but decreases again for greater lengths in proportion to such lengths.

Mémoires de la Société d'Anthropologie de Paris, Tome i. (3e Série) 1er Fascicule.—A new series of the memoirs of the Anthropological Society of Paris commences with this number, and opportunity has been taken to introduce a few modifications into the manner of their publication. In future each memoir will be paged separately, and will be sold at the price of three centimes a page. This part contains an essay by M. A. Dumont, on the birth rate in the canton of Beaumont-Hague. The author says that France is menaced by five great perils: (1) Foreign invasion; (2) advance of plutocracy; (3) increase of colonialism; (4) lowering of the birth-rate; (5) increase of rural emigration. With regard to these last two dangers, it is of the utmost importance to determine their extent, their causes, and their remedies. The tables given by the author show that in almost all the villages in the canton of Beaumont-Hague the population has steadily diminished within the last sixty years, in some cases as much as fifty per cent., and this large diminution of population appears to result from the excess of the death rate over the birth rate. In one parish only has the population increased, and this has been due to the fact that a number of those employed in the Government works at Cherbourg have taken up their residence here within the last few years since 1886. M. Dumont discusses at length the causes of the very low birth rate throughout the canton, and comes to the conclusion that it is closely connected with the emigration of the more well-to-do inhabitants, and that increase in population is in inverse proportion to individual effort for personal advancement.

SOCIETIES AND ACADEMIES.

Royal Society, Dec. 14, 1893.—"Sugar as a Food in the Production of Muscular Work." By Dr. Vaughan Harley.

In the above paper the author first gave the chemical reasons that led him to believe that sugar was the principal factor in the production of muscular energy.

He then went on to prove that it could be experimentally demonstrated that the addition of large quantities of sugar to the diet caused an increased capability of doing muscular work.

By means of the ergograph it was possible to estimate the amount of work accomplished under various circumstances by the middle finger of each hand, weights of 3 and 4 kilogrammes being raised. The total height to which the weight was lifted, being multiplied by the weight used, expressed in kilogramme metres the amount of work accomplished.

The first step was to ascertain the value of sugar when taken alone in the production of muscular work. During a twenty-four hours' fast, on one day, water alone was drunk; on another, 500 grammes of sugar was taken in an equal quantity of water. It was thus found that the sugar not only prolonged the time

before fatigue occurred, but caused an increase of 61 to 76 per cent. in the muscular work done.

In the next place, the effect of sugar added to the meals was investigated.

The muscle energy producing effect of sugar was found to be so great that 200 grammes added to a small meal increased the total amount of work done from 6 to 39 per cent.

Sugar (250 grammes) was now added to a large mixed meal, when it was found not only to increase the amount of work done from 8 to 16 per cent. but increase the resistance against fatigue.

As a concluding experiment, 250 grammes of sugar was added to the meals of a full diet day; causing the work done during the period of eight hours to be increased 22 to 36 per cent.

Mathematical Society, January 11.—Mr. A. B. Kempe, F.R.S., President, in the chair.—The President communicated to the members present the intelligence which had just reached him of the death of Dr. H. R. Hertz, an honorary member of the society. The following communications were made:—"The Types of Wave-motion in Canals," by Mr. H. M. Macdonald; "On Green's Function for a System of Non-intersecting Spheres," by Prof. W. Burnside, F.R.S.

PARIS.

Academy of Sciences, January 8.—M. de Lacaze-Duthiers in the chair.—Studies on the formation of carbon dioxide and the absorption of oxygen by the detached leaves of plants, by MM. Berthelot and G. André. The authors have studied, under the most varied conditions, wheat, *Sedum maximum*, and *Corylus avellana*. Carbon dioxide is evolved from leaves in the absence of oxygen, but much more in the presence of oxygen and moisture. More oxygen is absorbed than is required for the production of the excess of carbon dioxide produced in an oxidising atmosphere. These reactions only occur in the presence of water.—Remarks on a note by M. Dunér, entitled "Is there Oxygen in the Atmosphere of the Sun?" by M. J. Janssen. The author considers M. Dunér's method unable to decide this question, and quotes experimental evidence to show that the effects considered are terrestrial.—Conclusions relative to the manipulation of the soil of oyster parks, and as to the causes of oysters becoming green, by MM. Ad. Chatin and A. Muntz.—On the approximate expressions for the higher terms in the development of the perturbation function, by M. N. Coculesco.—On the influence exercised by solar spots on the quantity of heat received by the earth, by M. R. Savélief. The author discusses the relationship of the activity of the solar surface and the calorific intensity of the solar radiation at the limits of the atmosphere, and draws the conclusion that with increase of solar activity, as evidenced by increase in the number of sunspots, there is increase of calorific intensity.—Thermodynamics of gases. Comparative values of the approximations of Joule's law and of Mariotte's and Gay-Lussac's laws, by M. Jules Andrade. Joule's law and Mariotte's and Gay-Lussac's laws are obeyed by gases within limits of the same order of magnitude.—The law of the magnetisation of soft iron, by M. P. Joubin. The author compares the formulæ representing the intensity of magnetisation of soft iron, in terms of the strength of field and the susceptibility of the material, with Van der Waal's formula for fluids, and concludes that the phenomena of the magnetisation of iron are analogous to the phenomena presented by a saturated fluid, and might be calculated by similar formulæ. Feebly magnetised bodies obey laws analogous to those of fluids far from their points of saturation.—On the absolute value of the magnetic elements on January 1, 1894, by M. Th. Moureaux. The values are given for Parc Saint-Maux and Perpignan.—On the composition of aqueous solutions, according to their indices of refraction, by M. Paul Bary. From the examination of a series of dilute solutions of metallic salts the result is deduced "that, if the theory of M. Arrhénius is admitted, the dissociated salts behave with regard to refraction as if the dissociation does not exist."—Researches on the chemical action of *abrostol* (calcium naphthylsulphonate) on wine, by M. Scheurer-Kestner.—On the presence of poison glands in adders, and on the poisonous properties of the blood of these animals, by MM. C. Phisalix and G. Bertrand. The poisonous principles of adder's blood proceed from the internal secretion of the superior labial glands, and the similarity of these principles to echidnine explains the immunity of the adder for viper poison.—Nitrates in living plants, by M. Demoussy.

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—On the influence of light and altitude on the striation of the valves of diatomacæ, by Frère J. Héribaud.—The insertion of the spores and the direction of the partitions in protobasidia, by M. Paul Vuillemin.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Geological Survey of Canada, Annual Report, Vol. v. 2 Parts and Maps (Ottawa).—Human Physiology: J. Thornton (Longmans).—The Elements of Co-ordinate Geometry: W. Briggs and J. H. Bryan, Part 1, 2nd Edition (Clive).—Illustrated Guide to British Mosses: H. G. Jameson (Eastbourne, the Author).—A Text-book of Solid or Descriptive Geometry: A. B. Dobbie (Blackie).—A Pocket-book of Marine Engineering, Rules and Tables: A. E. Seaton and H. M. Rounthwaite (Griffin).—Do you Know it? &c. C. E. Clark (Saxon).—Annuaire de l'Académie Royale des Sciences, &c., de Belgique, 1894 (Bruxelles).—Forschungsberichte aus der Biologischen Station zu Piön; Theil 2: Dr. O. Zacharias (Berlin, Friedländer).—Elements of Synthetic Solid Geometry: Prof. N. F. Dupuis (Macmillan).—Electric Waves: Dr. H. Hertz, translated by D. E. Jones (Macmillan).—Discovery of Lakes Rudolf and Stefanie, 2 Vols.: Lieut. L. von Höhnel, translated (Longmans).

PAMPHLETS.—Guide to the Examinations in Agriculture, and Answers to Questions, Advanced Series (Blackie).—Ditto, Physiology, Elementary Series (Blackie).—Ditto, Elementary Metallurgy, ditto (Blackie).—Ditto, Elementary Principles of Mining, ditto (Blackie).—Ditto, Chemistry, ditto (Blackie).—Test Papers in Mathematics: R. Roberts (Blackie).—Twenty-third Report of the Aeronautical Society of Great Britain (Greenwich, Richardson).—Report on the Destruction of Beer-casks in India by the Attacks of a Boring Beetle: W. F. H. Blandford (Eyre and Spottiswoode).—The Palm Weevil in British Honduras: W. F. H. Blandford (Eyre and Spottiswoode).—Annales de l'Observatoire Magnétique de Copenhague 1892: A. Paulsen (Copenhague).—Entwurf einer Neuen Integralrechnung auf Grund der Potenzial-Logarithmal- und Numeralrechnung. Zweites Heft: Dr. J. Bergbohm (Leipzig, Teubner).

SERIALS.—Actes de la Société Scientifique du Chili, Tome 3, 1 and 2 Livr. (Santiago).—Engineering Magazine, Souvenir No. (New York).—Journal of Anatomy and Physiology, January (Griffin).—American Meteorological Journal, January (Ginn).—Himmel und Erde, January (Berlin).—Xenia Orchidacea, Dritter Band, Sechstes und Siebentes, Heft (Leipzig, Brockhaus).—Mund, January (Williams and Norgate).—Bulletin Astronomique, December (Paris).

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