

ing, business and agriculture; and the Senate is prepared to establish classes, in any subject whatever, for which there is sufficient demand. Students from the Canadian universities serving in the Army will have their Khaki College work "credited" on the return. When demobilisation sets in, some time must elapse before the Canadian soldiers then in England can be repatriated; Khaki College, while equipping men for their return to civil life, will prevent them from degenerating into vicious habits of idleness apt to ensue from a prolonged life in the base camps. It is this aspect of the movement which first appealed to the High Canadian Command, and it is to anticipate the problems of the period of demobilisation that the High Command has encouraged the establishment at the front of the University of Vimy Ridge. That institution is, indeed, established on a basis quite as elaborate as the institution at Witley. Some idea of the scope of its work is afforded by the long list of lectures on history and economics, applied science, languages and literature, agriculture, and business. At Witley there are 200 studying scientific agriculture, and 200 taking the business course. There are 150 students of history, 125 of English, 75 of the classics, 100 of French, 50 of mathematics, and smaller numbers in other courses.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Microscopical Society, December 12, 1917.—Mr. E. Heron-Allen, president, in the chair.—W. Bateson: Cytology and genetics. Attempts to find regularity in the distribution of chromosome numbers had generally been unsuccessful, but attention was directed to the recent work of Winge, who, by preparing a graph of these numbers in plants, had shown that simple multiples of 2 and 3 occur with special frequency, while prime numbers are rare and exceptional. A survey was given of the phenomena of linkage between genetic factors as demonstrated in breeding experiments, with a discussion of Morgan's suggestion that this linkage is due to a linear arrangement of the linked factors in the same chromosome. Whether the proposition in its entirety was established or not might be doubtful, but the factors certainly behaved as if arranged in lines, and, as represented by the theory, a great diversity of genetic and cytological observations relating to the heredity of sex and other characters assumed an orderly form.—G. S. West: A new species of *Gongrosira*. A lime-encrusted alga, forming somewhat nodular masses 4-9 mm. thick, of a vivid green colour, was found at Westen Mouth, Devon, growing in such a position that it received the full force of a stream of water falling about 2 ft. It proved to be new, and is described as *G. scourfieldii*.

Aristotelian Society, December 17, 1917.—Dr. H. Wilton Carr, president, in the chair.—Dr. G. E. Moore: The conception of reality. Bradley asserts both (i) "Time is not real," and (ii) "Time exists, is a fact, and is"; and he evidently thinks that these two assertions are compatible. In truth, however, (i) ought to include, as part of its meaning, "There are no temporal facts," while (ii) ought to include, as part of its meaning, "There are some temporal facts"; so that the two assertions are not compatible. It is suggested that the reason why Bradley supposes them to be compatible is because he sees (a), what is true, that "Temporal facts are unreal" is compatible with "We think of temporal facts," and supposes also (b), what is false, that "There are no temporal facts" is compatible with "We think of temporal facts." If (a) and (b) are both true, it would follow that "Temporal facts

are unreal" could not include as part of its meaning "There are no temporal facts"; and that hence (i) must be compatible with "There are some temporal facts." In truth, however, there is no difficulty in supposing that (b) is false.

EDINBURGH.

Royal Society, December 3, 1917.—Dr. Horne, president, in the chair.—Principal A. P. Laurie and A. King: Note on the hydrolysis of acid sodium sulphate. These experiments were carried out with the view of throwing light on a practical problem arising in the manufacture of explosives, and are an investigation of the effects of cooling solutions of acid sodium sulphate of various strengths, showing the laws governing the separation of the normal salt.—Dr. W. Wright Wilson: The absence of a nucleus in crystals of uric acid. It was suggested that the lack of a nucleus might be hereditarily connected with abnormal conditions.—A. M. Williams: The thermodynamics of adsorption. This thermodynamic investigation into heat effects accompanying adsorption led to expressions for three isothermal heats of adsorption of a gas and for the heat of immersion of a powder in a liquid. The effect of the variation of the surface of an adsorbent when adsorbing was examined, and it was shown from Titoff's observations that the divergence between calculated and observed values of the heat of adsorption could be explained on the assumption of a change of surface area. The fractional change of surface per c.c. adsorbed could be calculated, and also the surface energy per gram adsorbent *in vacuo*.—R. K. S. Lim: Experiments on the respiratory organs of the shore-crab (*Carcinus maenas*). The following facts were established. The direction of the respiratory current in the shore-crab is from behind forwards, whether the animal is lying above sand or buried in it. Occasionally this direction is reversed. Sea-water is sucked in beneath the carapace through four separate spaces which communicate with corresponding spaces between the gill origins. The direction of these inlets is such that the current in the gill chambers tends to travel forwards and inwards. The gills being radially arranged, and being placed across the path of the current, forces it to pass through the individual gill lamellæ, thus thoroughly bathing their surfaces.

PARIS.

Academy of Sciences, December 3, 1917.—M. Paul Painlevé in the chair.—E. Picard: A functional equation occurring in the theory of the distribution of electricity according to Neumann's law.—M. Vito Volterra was elected foreign associate in the place of the late M. Hittorf.—W. de Tannenberg: A question of indeterminate analysis.—J. Bosler: Meteorites and terrestrial eccentricity.—C. Matignon and F. Meyer: Monovariant equilibria in the ternary system, water, sodium sulphate, ammonium sulphate. An account of experiments undertaken to supply a rational solution of the problem of the preparation of ammonium sulphate from sodium bisulphate.—E. Hildt: New fractionating apparatus for petrol and other volatile products. The vapours are passed through a series of six Vigreux columns heated externally by the vapour of a petrol boiling between two well-defined temperatures. The vapour uncondensed by the first column passes on to a second column similarly vapour-jacketed with a lower boiling liquid. The apparatus figured shows six such columns in use, giving fractions $>150^{\circ}$, $130^{\circ}-150^{\circ}$, $110^{\circ}-130^{\circ}$, $90^{\circ}-110^{\circ}$, $70^{\circ}-90^{\circ}$, $50^{\circ}-70^{\circ}$, $<50^{\circ}$ C. Among the advantages claimed is the elimination of errors due to currents of air and to changes in the barometric pressure.—J. Laborde: A new method for the separation and estimation of lactic, succinic, and malic acids in wine. The method is based on the differences in

solubility of the calcium salts of the three acids in alcohol of varying concentration.—F. L. Navarro: The non-existence of the Cretacean in the island of Hierro (Canaries). The author, after visits to the island of Hierro in 1911 and 1917, has definitely proved the absence of Cretaceous deposits. The fossil, *Discoidea pulvinata*, described by J. Cottreau and P. Lemoine in 1910, was probably brought to the island by a ship as ballast.—F. Georgévitch: The evolutive cycle of *Myxidium gadii*.—A. Lécaillon: Aptitude for natural parthenogenesis considered in various races or varieties of the silkworm.—L. Boutan: The rôle of the fins in teleostean fishes with swimming bladder.—W. Kopaczewski: The mechanism of the toxic action of the serum of the muræna.

CAPE TOWN.

Royal Society of South Africa, October 17, 1917.—Dr. A. Jasper Anderson, vice-president, in the chair.—J. Moir: Spectrum phenomena in the chromium compounds, being part iv. of the spectrum of the ruby and emerald. It has been found that although aqueous solutions of the chromium salts do not show any narrow characteristic bands in the spectrum, yet when anhydrous (or nearly anhydrous) solutions are used the spectrum is crossed by narrow bands in the red similar to what are seen in the ruby or emerald spectrum. The solutions of chromium oxide in concentrated sulphuric and in fused metaphosphoric acid have been investigated, and the bands measured; they are very similar to those seen in the emerald, but not absolutely identical; while the bands of the ruby, although similar in arrangement, are displaced into a region of lower frequency. Both gem colours are due to chromium, but the vibrations are differently loaded (silica and beryllia against alumina).—J. Moir: Colour and chemical constitution Part iii.: Derivatives of the unknown ortho-para-phenolphthalein. Phthaleins in which one of the hydroxyl groups is ortho- and the other para- to the central carbon have been prepared from para-substituted phenols with oxybenzoylbenzoic acid. They are like the common phthaleins, but their absorption bands are broad, although in much the same position.

BOOKS RECEIVED.

The University of Sheffield. Calendar for the Session 1917-18. Pp. 767. (Sheffield: The University.)
 Medicinsk—Historiske Smaaskrifter. 18. Om Lægekunst Hos Perserne. By A. Christensen. (København: Vilhelm Trydes Forlag.)
 The Education of Engineers. By H. G. Taylor. Pp. vii+64. (London: G. Bell and Sons, Ltd.) 2s. net.
 Chemistry for Beginners. By C. T. Kingzett. Second edition. Pp. viii+150. (London: Baillière, Tindall, and Cox.) 2s. 6d. net.
 Les Universités et la Vie Scientifique aux Etats-Unis. By Prof. M. Caullery. (Paris: A. Colin.) 3.50 francs.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 3.
 ROYAL INSTITUTION, at 3.—Electricity as an Illuminator and Doctor: Prof. J. A. Fleming.
 CHILD STUDY ASSOCIATION, at 5.30.—Discussion: The Education of the Clever Child: Openers: G. F. Daniell and Miss M. Berryman.
 ASSOCIATION OF SCIENCE TEACHERS (University College, Gower Street), at 11.30.—Some Applications of Physics: Prof. Doveidge.—At 2.30.—Discussion: The Teaching of Physics in Girls' Schools: Opener: Prof. F. Womack.
 SATURDAY, JANUARY 5.
 ROYAL INSTITUTION, at 3.—Electric Dynamos, Motors, Transformers, and Railways: Prof. J. A. Fleming.
 GEOGRAPHICAL ASSOCIATION, at 11.30.—The Crafts of Britain, Past and Future: H. Wilson.—At 3.—Map Study in Geography and Military Education: W. E. Whitehouse.

NO. 2514, VOL. 100]

MONDAY, JANUARY 7.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Toxicity of Methyl Alcohol in Relation to its Industrial Uses. A Review of the Published Data: T. D. Morson.—The Rapid Estimation of Pyridine in Ammonia: T. F. Harvey and C. F. Sparks.—(1) Corrosion of Lead Roofing; (2) The Action of Rainwater on a Portland Stone: Prof. J. S. S. Brams.
 GEOGRAPHICAL ASSOCIATION (London Day Training College), at 10.30.—Discussion: Geography in Advanced Courses: Openers: Miss Odell, L. Brooks, and W. H. Barker.—At 5 (King's College).—Presidential address: The Great Goddess Mother Earth: Sir W. M. Ramsay.
 ARISTOTELIAN SOCIETY, at 8.—Is there a Mathematics of Intensity?: Prof. J. A. Smith.
 ROYAL GEOGRAPHICAL SOCIETY (Kensington Town Hall), at 3.30.—The Yukon since the Trail of '98: Mrs. George Black.

TUESDAY, JANUARY 8.

ASSOCIATION OF PUBLIC SCHOOL SCIENCE MASTERS (City of London School), at 12.15.—President's address: The Needs of our Education at the Present Day, with Special Reference to Science Teaching.—At 3.—Discussion: Compulsory Science in University Entrance Examinations: Opener: O. H. Latter.—At 3.45.—Discussion: Examination or Inspection as a Test of Science Teaching: Opener: G. F. Daniell.—At 5.15.—Discussion: Subsidiary Subjects in University Scholarship Examinations: Opener: H. de Havilland.
 ROYAL INSTITUTION, at 3.—Electric Telegraphs and Telephones: Prof. J. A. Fleming.
 INSTITUTION OF CIVIL ENGINEERS, at 5.30.—A Statement in Commemoration of the Founding of the Institution on January 2, 1818.—Rail-Creep: F. Reeves.—Creep of Rails: H. P. Miles.

WEDNESDAY, JANUARY 9.

ASSOCIATION OF PUBLIC SCHOOL SCIENCE MASTERS (City of London School), at 11.—Discussion: "Descriptive Astronomy" in the "Science for All" Course: Openers: Rev. A. L. Cortie, S.J., E. O. Tancock.—At 12.—Discussion: "Map Work" in Schools.
 MATHEMATICAL ASSOCIATION (London Day Training College), at 5.30.—The Graphical Treatment of Power Series: Dr. W. P. Milne.
 GEOLOGICAL SOCIETY, at 5.30.—The Highest Silurian Rocks of the Clun Forest District (Shropshire): L. D. Stamp.

THURSDAY, JANUARY 10.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—Electrical Signalling and Control on Railways: C. M. Jacobs.
 MATHEMATICAL ASSOCIATION (London Day Training College), at 11.—The Uses and Functions of a School-Mathematical Library: Dr. W. P. Milne.—Nomography: Dr. S. Brodetsky.—Some Suggestions for a Presentation of Mathematics in Closer Touch with Reality: G. Goodwill.—At 2.30.—President's address: Mathematics and Individuality: Prof. T. P. Nunn.—Discussion: The Position of Mathematics in the New Scheme of the Board of Education for Secondary Schools: Openers: W. D. Eggart, P. Abbott, Miss J. Dow.

FRIDAY, JANUARY 11.

ROYAL GEOGRAPHICAL SOCIETY (Kensington Town Hall), at 3.30.—The Old Life in Egypt: Miss Mary Brodriek.
 ROYAL ASTRONOMICAL SOCIETY, at 5.

CONTENTS.

	PAGE
Electrical Engineering. By Dr. A. Russell	341
Geodetic Base Measurements. By H. G. L.	342
Philosophy	342
Our Bookshelf	343
Letters to the Editor:—	
Magnetic Storm and Aurora, December 16-17.—Dr. C. Chree, F.R.S.	344
Sources of Potash. By Sir T. E. Thorpe, C.B., F.R.S.	344
National Power Supply	347
Economising Sugar	347
Notes	348
Our Astronomical Column:—	
New Stars in Spiral Nebulæ	351
"Companion to the Observatory for 1918"	351
Hyderabad Observatory Report	351
Prize Awards of the Paris Academy of Sciences, 1917	352
Committee on the Chemical Trade	353
The Physiology of Learning	353
International Fishery Statistics. By J. J.	354
The Production of Scientific Knowledge. (With Diagrams.) By Dr. C. E. Kenneth Mees	355
University and Educational Intelligence	358
Societies and Academies	359
Books Received	360
Diary of Societies	360

Editorial and Publishing Offices:

MACMILLAN AND CO., LTD.,
 ST. MARTIN'S STREET, LONDON, W.C.2.

Advertisements and business letters to be addressed to the Publishers.

Editorial Communications to the Editor.

Telegraphic Address: PHUSIS, LONDON.

Telephone Number: GERRARD 8830.