

W. A. Brockington, director of education for Leicestershire, raises several questions which deserve the earnest consideration of all who desire a complete and duly correlated national system of education. In the first place, there is the problem connected with the differentiation of secondary schools and the differentiation of the curricula in these schools. Then the question as to how to secure an adequate supply of trained teachers in secondary schools is discussed. "It is of no use," says Mr. Brockington, "to palter with the problem of the training of secondary-school teachers." Thirdly, there is the problem as to the length of the secondary-school life. "Public opinion has still to be educated into the general acceptance of the axiom that secondary education begins at the age of ten or eleven, and must be continued until at least the age of sixteen or seventeen; and that, accordingly, the privilege of free secondary education imposes a real obligation of self-sacrifice upon the parent." Commenting upon what should be the character of secondary education in the future, Mr. Brockington maintains that we should preserve what is good in traditional knowledge, and, keeping our schools in living touch with the changing needs of society, make the curriculum of secondary schools an epitome of the experience of the race. All sorts of teaching, if properly imparted, represent culture—science, theoretical and applied, the construction of engines, and manual work.

### SOCIETIES AND ACADEMIES.

#### DUBLIN.

**Royal Dublin Society**, December 21, 1909.—Dr. J. M. Purser in the chair.—Prof. W. Brown: Permanent steel magnets. With a given quality of steel the dimension-ratio can be found which gives the most effective magnet with a minimum weight of material. Also the results of six months' tests of fourteen different steels show that magnets made of chrome and tungsten steels are the most permanent.—Major F. Eassie: Some variations in the skeleton of the domestic horse and their significance. The author states that in whole races of the domestic horse the skeleton gives proof of deterioration from the type of the wild species, and that to a great extent this deterioration exists in horses in every country, and that it is easily recognisable in the living animal. It is due originally to unsuitable environment and breeding from deteriorated stock. As the result of observations of a large series of horses of different races, the author found three main variations in the skeleton, viz. in the relative length of the segments of the head and spine, of the arm, and of the thigh. That the short spine is a primitive character he considers proved by the remains of horses found in recent formations in the valley of the Nerbudda. In the evolution of the horse from its remotest ancestors in the Lower Eocene the arm and the thigh have gradually been shortened, and this shortening has determined its speed. The author also suggests that the short spine, arm, and thigh, respectively, were dominant characters as regards heredity, and that deterioration from the type of the wild species was probably recessive.

#### PARIS.

**Academy of Sciences**, December 27.—M. Bouchard in the chair.—The president announced the death of M. Bouquet de la Grye, past-president of the academy, and of M. Lortet.—Émile Picard: A class of developments in series of fundamental functions connected with certain functional equations.—M. de Forcrand: The hydrates of rubidium and caesium. Particulars are given of the isolation of  $\text{RbOH} + \text{H}_2\text{O}$ ,  $\text{RbOH} + 2\text{H}_2\text{O}$ ,  $\text{CsOH} + \text{H}_2\text{O}$ . The melting points of these compounds and heats of solution are given.—R. Jarry Desloges: The gradual retreat of the southern polar cap of Mars. A reproduction is given of sixteen photographs of the polar cap of Mars at dates between June 23 and October 19.—M. Coggia: Observations of comets made at the Observatory of Marseilles with the Eichens 26-cm. equatorial. Data are given for Daniel's and Halley's comets on December 11 and 16.—M. Borrelly: Observations of Daniel's comet, 1909e, made at the Observatory of Marseilles with the 16-cm. finder. Data given for December 9, 10, and 11. The

comet is round, with a nucleus placed eccentrically.—P. Chofardet: Observations of the new Daniel's comet, 1909e, made at the Observatory of Besançon with the bent equatorial. Data given for December 14, 16, and 18. Comet appeared as a round nebulosity,  $30''$  to  $40''$  diameter, with a slight condensation at its centre. Brightness, as a whole, about the twelfth magnitude.—MM. Montangeard and Rossard: Observations of Halley's comet made at the Observatory of Toulouse with the Brunner-Henry equatorial. Data given for December 4, 8, 14, and 16.—J. Haag: Families of Lamé composed of surfaces admitting a plane of variable symmetry.—D. Pompéiu: The representation of analytical functions by definite integrals.—Charles Reignier: The calculation of the fly-wheels of rolling mills.—L. Lecornu: The fly-wheel of motors for flying machines.—E. Jouguet: The velocity of waves of shock and of combustion.—Jean Becquerel: The influence of a magnetic field on the damping of light vibrations. A discussion of the absorption bands produced in a magnetic field by xenotime and tysonite at the temperature of liquid ( $-253^\circ\text{C}$ ) and solid hydrogen ( $-259^\circ\text{C}$ ).—V. Bournay: The adsorption of ions.—L. Houllé: The preparation of thin films by volatilisation in a vacuum. A platinum wire is coated with a layer of the metal to be deposited, and heated to the necessary temperature in a high vacuum. The film is formed on a glass plate kept in rotation near the hot wire. The method has been successfully applied to the production of thin films of platinum, gold, silver, iron, copper, cadmium, zinc, and tin.—G. A. Hemsleach and C. de Watteville: The yellow, orange, and red regions of the high-temperature flame spectrum of calcium. Measurements are given for the calcium lines produced in the oxy-acetylene flame; it is shown that the spectrum is very similar to that observed by King in the electric furnace at a temperature of about  $2800^\circ\text{C}$ .—E. Briner and A. Wroczynski: Chemical reactions in gases submitted to very high pressures. The decomposition of nitric oxide and the formation of nitrosyl chloride. Pure NO at pressures greater than 250 atmospheres is decomposed into  $\text{N}_2\text{O}_3$  and  $\text{N}_2$ . This corresponds to the observed production of nitrosyl chloride by the compression of a mixture of nitric oxide and hydrochloric acid.—L. Brüninghaus: The law of maximum phosphorescence: an attempt at a theory.—R. Boulouch: A demonstration of the phase rule. A reply to remarks by M. Müller on the same subject.—H. Baubigny: The necessity for the exact study of reactions. Reply to a criticism of M. Colson.—Em. Vigouroux: The alloys of nickel and copper. A study of the electromotive forces of these alloys does not point to the existence of any definite compounds of these two elements.—Em. Pozzi-Escot: The estimation of nitric nitrogen by reduction with amalgamated aluminium. It is claimed for the process described that it possesses advantages both in speed and accuracy over those commonly employed.—Georges Dupont: The stereochemical isomerides of hexine-3-diol 2-5,  $\text{CH}_3\text{CH}(\text{OH})\text{C}\equiv\text{C}-\text{CH}(\text{OH})-\text{CH}_3$ . The two isomers were separated by means of the properties of the dibromides.—M. Danaïta: The synthesis of 5:7:5':7'-tetrabromo-indigo and 5:7:5':7'-tetrachloro-indigo.—Gabriel Bertrand and M. Holderer: Bellase and the diastatic splitting up of cellulose.—L. Cayeux: The mineralogical evolution of the primary oolitic iron minerals of France.—J. Dumont: The chemical decomposition of rocks. Rocks of different types were submitted to the action of pure water, carbonic acid, dilute hydrochloric acid, and solution of calcium chloride. The rocks were slowly attacked in all these solutions, the amount of material finally coming into solution being very small, and depending upon the state of division of the rock.—Em. Perrot and M. Leprince: *Adenium Hongkel*, the ordeal poison of the French Soudan. This plant is called *Kidi-Saramé* by the natives. From the aqueous alcoholic extract of the flowers a highly toxic active principle was isolated of the constitution  $\text{C}_{26}\text{H}_{31}\text{O}_8$ . It was definitely proved to be neither an alkaloid nor a glucoside, and its true nature still remains undetermined.—J. E. Abelous and E. Bardier: The general physiological effects of urohypotensine. Experimental studies on rabbits and dogs.—A. Contamin: The X-rays and cancerous mice. The action of the X-rays is more efficacious when the tissue of the

tumour is young; the resorption of a large tumour causes the death of the animal, probably by poisoning.—**Cl. Regaud** and **Th. Nogier**: The complete and definitive sterilisation of the testicles of the rat, without any lesion of the skin, by a single application of X-rays filtered through aluminium.—**Fred Vies**: The value of muscular striæ from the spectrographic point of view.—**Jules Auclair** and **Paul Braun**: Two cases of Maltese fever probably contracted at Paris. Both cases, which were definitely proved to be true Maltese fever, were probably contracted from handling sheep skins.—**M. Ledentu**: Vascular tumours and aneurisms of the bones.—**P. Bonnier**: The bulbar centres and intestinal diaphylaxy.—**B. Collin**: Some remarks on two new species, *Dendrosomides paguri* and *Podophrya fixa*.—**Gabriel Arthaud**: The salivary spirochaetes.—**J. Savornin**: The palæogeographical evolution of Cape Bon and the direction of the folds of the Atlas, considered as the result of two orthogonal orogenic actions.—**Em. de Martonne**: The unequal distribution of glacial erosion in the bed of Alpine glaciers.—**E. Noël**: Tunisian hydrogeology.—**Henryk Arcowski**: The dynamics of climatic variations.

GÖTTINGEN.

**Royal Society of Sciences.**—The *Nachrichten* (physico-mathematical section), part iii., for 1909, contains the following memoirs communicated to the society:—

July 17.—**H. Bohr**: The summability of Dirichlet series.—**D. Hilbert**: The theory of conformal representation.—**D. Hilbert**: The form of a surface of the fourth order.  
July 31.—**A. Coehn** and **U. Raydt**: The quantitative validity of the law of distribution of charge between dielectrics in contact.—**C. Runge**: The determination of position in balloons.—**P. Koebe**: The uniformisation of given analytic curves (iv.).

DIARY OF SOCIETIES.

THURSDAY, JANUARY 6.

**RÖNTGEN SOCIETY**, at 8.15.—(1) A Comparison between the Skotographic and Electroscopic Effects of certain Animal Substances with the same Effects of Uranium, Thorium, &c.; (2) Retardation of Electroscopic Leak by Means of Recognised Radio-active and other Substances; (3) Masked Radio-activity; (4) Influence of Radio-active and certain other Substances upon the Division of Animal Cells: **Dr. W. S. Lazarus-Barlow**.

FRIDAY, JANUARY 7.

**INSTITUTION OF MECHANICAL ENGINEERS**, at 8.—The Application of the Pitot Tube to the Testing of Impulse Water-wheels: **W. R. Eckart**.—An Account of a Visit to the Power Plant of the Ontario Power Co. at Niagara Falls: **C. W. Jordan**.

**INSTITUTION OF CIVIL ENGINEERS**, at 8.—Oil Fuel: **D. S. Richardson**.

MONDAY, JANUARY 10.

**ROYAL GEOGRAPHICAL SOCIETY**, at 8.30.—Travels of a Naturalist in South-west Africa: **Prof. H. H. W. Pearson**.

**VICTORIA INSTITUTE**, at 4.30.—Modern Conceptions of the Universe: **G. F. C. Searle, F.R.S.**

TUESDAY, JANUARY 11.

**ILLUMINATING ENGINEERING SOCIETY**, at 8.—Glare, its Causes, and Effects: **Dr. J. H. Parsons**.

**INSTITUTION OF CIVIL ENGINEERS**, at 8.—The Design of Rolling Stock for Smooth-trail Working on Heavy Gradients: **F. W. Bach**.

WEDNESDAY, JANUARY 12.

**GEOLOGICAL SOCIETY**, at 8.—The Igneous and Associated Sedimentary Rocks of the Glensaul District (County Galway): **C. I. Gardiner** and **Prof. S. H. Reynolds**. With Palæontological Notes by **F. R. C. Reed**.—The Gneisses and Altered Dacites of the Dandenong District (Victoria), and their Relations to the Dacites and to the Grano-Diorites of the Area: **Prof. E. W. Skeats**.—Recent Improvements in Rock-section Cutting Apparatus: **H. J. Grayson**.

THURSDAY, JANUARY 13.

**ROYAL SOCIETY**, at 4.30.—*Probable Papers*: On the Atomic Weight of Strontium: **Sir Edward Thorpe, C.B., F.R.S.**, and **A. G. Francis**.—On the Approximate Arithmetical Solution by Finite Differences of Physical Problems involving Differential Equations, with an Application to the Stresses in a Masonry Dam: **L. F. Richardson**.—On a Method of Determining the Viscosity of Gases, especially those available only in Small Quantities: **A. O. Rankine**.—Recombination of Ions at Different Temperatures: **P. Phillips**.—On the Electricity of Rain and Snow: **Dr. G. C. Simpson**.—On the Polarisation of X-Rays compared with their Power of Exciting High Velocity Kathode Rays: **L. Vegard**.

**MATHEMATICAL SOCIETY**, at 5.30.—The Transformations of Coordinates which can be used to transform One Physical Problem into Another: **H. Bateman**.—On Homogeneous Oscillation: **Dr. W. H. Young**.—On the Determination of a Semi-continuous Function from a Countable Set of Values: **Dr. W. H. and Mrs. Young**.—Note on a Former Paper on the Theory of Divergent Series: **G. H. Hardy**.—On the Expression of

a Certain Function by Means of a Series of Polynomials: **Dr. H. F. Baker**.—On the Double Sixers of a Cubic Surface: **Dr. H. F. Baker**.

**INSTITUTION OF ELECTRICAL ENGINEERS**, at 8.—Lord Kelvin's Work in Telegraphy and Navigation (*Second Kelvin Lecture*): **Prof. J. A. Ewing, C.B., F.R.S.**

FRIDAY, JANUARY 14.

**MALACOLOGICAL SOCIETY**, at 8.—Note on *Helix desertorum*: **Mrs. G. B. Longstaff**.—Description of *Thersites (Glyptorhagada) Hilliert, n.sp.*, from Central South Australia: **E. A. Smith**.—Note on *Athoracophorus Schaumlandi*: **Henry Suter**.—The Ampullaridæ of the Eastern Hemisphere. Description of New Species of *Donovania*, *Scutellina*, *Fissurella*, and *Pisania*: **G. B. Sowerby**.—Marine Mollusca from the Kermadec Islands. Notes on Polyplacophora, chiefly Australasian: **T. E. Iredale**.—Helicoids from New Guinea and Description of a New Species of Papua: **G. K. Gude**.

CONTENTS.

PAGE

The Ether of Space. By **H. L.** . . . . . 271  
 New Methods of Weather Forecasting . . . . . 271  
 Medical Embryology. By **Dr. Francis H. A. Marshall** . . . . . 272  
 Fundamental Problems of Psychiatry . . . . . 273  
 The Autobiography of **N. S. Shaler**. By **Prof. Grenville A. J. Cole** . . . . . 274  
 Mathematical Text-books . . . . . 275  
 Our Book Shelf:—  
 McCook: "Ant Communities and How they are Governed. A Study in Natural Civics" . . . . . 276  
 Baker: "Sextant Errors."—**C. V. B.** . . . . . 276  
 "The British Journal Photographic Almanac, 1910" . . . . . 277  
 Ellis: "Outlines of Bacteriology (Technical and Agricultural)."—**Prof. R. T. Hewlett** . . . . . 277  
 Browne: "A Descriptive Catalogue of the Dobrée Collection of European Noctuae" . . . . . 277  
 Samuelson: "The Human Race: its Past, Present, and Probable Future."—**E. H. J. S.** . . . . . 277  
 Letters to the Editor:—  
 The Heat developed during the Absorption of Electricity by Metals.—**Profs. O. W. Richardson and H. L. Cooke** . . . . . 278  
 Malaria and Ancient Greece.—**Dr. George A. Auden** . . . . . 278  
 An Example of Spurious Correlation.—**Dr. Gilbert T. Walker** . . . . . 279  
 On Fluorescence Absorption.—**J. Butler Burke** . . . . . 279  
 Adsorption.—**Alfred Tingle** . . . . . 279  
 The Terminal Velocity of Fall of Small Spheres in Air.—**Edith A. Stoney** . . . . . 279  
 Positions of Birds' Nests in Hedges.—**A. R. Horwood** . . . . . 279  
 Studies in Pylchæ Larvæ.—**F. H. Gravely** . . . . . 280  
 Cross-fertilisation of Sweet-peas.—**π.** . . . . . 280  
 A Supposed New Mineral.—**Richard J. Moss and Henry J. Seymour** . . . . . 280  
 The Heart of Antarctica. (*Illustrated.*) By **Prof. J. W. Gregory, F.R.S.** . . . . . 280  
 Game Preserves in British East Africa. (*Illustrated.*) By **Sir H. H. Johnston, G.C.M.G., K.C.B.** . . . . . 283  
 Problems of Science Teaching in Schools. By **G. F. Daniell** . . . . . 284  
 Magnetic Survey of South Africa. By **G. W. W. M. Bouquet de la Grye** . . . . . 285  
**Prof. J. S. H. Pellat** . . . . . 287  
**Duke Karl Theodore of Bavaria** . . . . . 287  
 Notes . . . . . 288  
 Our Astronomical Column:—  
 Astronomical Occurrences in January . . . . . 292  
 Halley's Comet . . . . . 292  
 Elements and Ephemeris for Daniel's Comet, 1909e . . . . . 292  
 Solar Activity and Magnetic Storms . . . . . 293  
 Star Swarms . . . . . 293  
 A Large Nebula in Cetus . . . . . 293  
 Annuaire astronomique et météorologique, 1910 . . . . . 293  
 Prize Awards of the Paris Academy of Sciences . . . . . 293  
 Climatological Reports . . . . . 294  
 Educational Tendencies in the United States . . . . . 295  
 Ole Römer and the Thermometer. By **Dr. Kirstine Meyer** . . . . . 296  
 University and Educational Intelligence . . . . . 298  
 Societies and Academies . . . . . 299  
 Diary of Societies . . . . . 300