Calendar of Discovery and Invention.

January 1, 1801.—After the enunciation of Bode's law and the discovery of Uranus, it was thought there must be an undiscovered planet the path of which lay between the orbits of Mars and Jupiter. A group of astronomers, therefore, agreed to make a systematic search, and on January 1, 1801, Giuseppe Piazzi, at Palermo, saw Ceres, the first of the minor planets or asteroids. By 1845 four others had been discovered, but since the application of photography to astronomy many hundreds have been identified. Ceres, however, is the largest, being 485 miles in diameter.

January 1, 1855.—Among the methods used for determining the density of the earth is that introduced by Airy, who, in 1826 and 1828, with Whewell and Sheepshanks, made pendulum experiments at Dolcoath Mine, Cornwall. Later, he repeated these experiments at Harton Colliery, South Shields, at a depth of 1260 feet, and gave an account of these in a lecture at South Shields on January 1, 1855. The result he obtained gave 6·56 as the mean density—a value, however, considerably too high.

January 2, 1818.—The foundation of the Institution of Civil Engineers was due to six engineers, of whom the best known were William Maudslay, Joshua Field, and Henry Robinson Palmer. The first formal meeting was held at the Kendal Coffee House, Fleet Street, on January 2, 1818. On January 23, 1820, it was proposed to ask Thomas Telford to become president. He was formally installed on March 21 of that year, and held the presidency until his death in 1834. The first home of the Institution was at 15 Buckingham Street, Adelphi, and the first volume of *Proceedings* was issued in 1836.

January 3, 1752.—While spectrum analysis was due to Newton, it was the young divinity student Thomas Melvill who first used a prism for the examination of various flames; introducing sal-ammoniac, potash, alum, etc., into burning spirits. He gave an account of his experiments to the Medical Society of Edinburgh on January 3, 1752, while another paper of his was read to the Royal Society in 1753 by Bradley. (See NATURE, November 5, 1914, vol. 94, p. 263.)

January 4, 1896.—On this day Röntgen gave an account of his discovery of X-rays to the Physical Society of Berlin. His discovery was made on November 8, 1895, and was described in a paper entitled "On a New Kind of Rays," which appeared in the *Sitzungsberichte der Würzburger physik.-medic. Gesellschaft*. A translation of this paper was given in NATURE of January 23, 1896, together with an article and an X-ray photograph contributed by Mr. A. A. Campbell Swinton.

January 7, 1610.—No accidental discovery has had more far-reaching results than the discovery of the principle of the telescope. From the report of what Lippershey had done, Galileo made telescopes magnifying three, eight, and thirty times, and on January 7, 1610, at one o'clock in the morning, observed for the first time three of the satellites of Jupiter, and thus ushered in the era which has seen so vast an extension of our knowledge of the sky.

January 7, 1785.—The first to make a balloon ascent solely for scientific purposes, Dr. John Jeffries, on January 7, 1785, with the famous aeronaut Blanchard, crossed the English Channel from Dover to Calais, where a marble column was erected to commemorate the feat. On an ascent from London in 1784, Jeffries carried with him meteorological instruments and obtained samples of air at various heights for Cavendish. E. C. S.

Societies and Academies.

LONDON.

British Mycological Society, November 20.—**W. J. Dowson**: An unusual species of Botrytis attacking Narcissus. The fungus is the cause of 'fire,' marking the leaves with one or more yellow patches. The spores of the fungus are very large, and germinate with as many as thirteen germ tubes after up to one hour in water or in dilute glycerine.—**Miss A. Lorrain Smith**: A new family of lichens. The lichen *Cryptothecia subnidulans* was described by the late Dr. Stirton, and has led to much difficulty in assigning it to a systematic position. Stirton's herbarium has revealed three additional species of the genus and two closely allied ones for which a new genus is proposed; the two genera form a family characterised by the apparently double-walled ascus containing septate or muriform spores and embedded in a lax peridium of interwoven hyphæ. Affinity with the fungi Myriangiales and Gymnoascales is suggested; the nearest lichen allies appear to be Thelocarpaceæ and Mycoporaceæ.—**O. V. Darbishire**: Isidia and soralia of lichens. Isidia in *Peltigera prætextata* develop endogenously from special hyphæ which make their way to the surface, breaking through the cortex or making use of a crack. The mature isidia are very highly developed assimilators. There is a primary cortex on the upper surface with walls of wavy outline. The secondary cortex is similar to the cortex of the thallus. The gonidia are fairly closely packed towards the upper cortex with a very loose arrangement just inside the lower cortex. This cortex is of one layer of cells, with sinuate walls and interrupted here and there by pores. Soredia also have an endogenous origin. A few gonidia are gradually surrounded by the fungus and the differentiating soredium is raised to the surface of the sorial tissue, from which it becomes detached as a reproductive organ.—**W. R. I. Cook**: The genus Ligniera. Cross inoculations have shown that several species which have been described are merely host varieties. Infection takes place by zoospores entering root hairs. Spores serve as a resting stage and for propagation within the plant. Reduction division occurs at the formation both of spores and zoospores. Conjugation has not been seen.—**W. A. Roach**: On the nature of disease resistance in plants, with special reference to the wart disease of potatoes. Wart disease is an example of physiological resistance. Evidence at present suggests that immune and susceptible varieties form two distinct classes and not end members of a continuous series. The reaction towards wart disease is unaffected by grafting on either a foliage system, a root system, or of a complete plant of opposite reaction to the disease. Immunity from, or susceptibility to, wart disease is therefore probably innate to the cell and must be sought in compounds which cannot cross a graft fusion layer unchanged, and so probably cannot leave a cell. These compounds may be proteins.

Geological Society, December 1.—**Howel Williams**: The geology of the Snowdon massif (North Wales). The area described is limited on the north-east by the Pass of Llanberis, on the south-east by the Vale of Gwynant, on the south-west by the Colwyn and Gwyrfai Valleys to near the village of Salem, and on the north-west by the supposed line of junction between the Cambrian and the Ordovician rocks. The general stratigraphical succession is made out. The exact relationship between the Ordovician and the Cambrian systems on the northern flank of Snowdon is uncertain. Ramsay's threefold division of the

Snowdon Volcanic suite remains the most useful basis for its study. The Upper and Lower Rhyolitic series were derived from a potash-rich magma. The approximate age of the Snowdon Volcanic suite is inferred to be between Middle Llandeilian (zone of *Climacograptus peltifer*) and Middle Caradocian (zone of *Dicranograptus clingani*). Many dykes, inclined sheets, and bosses of quartz-porphyry, micro-granophyre, and intrusive rhyolite occur on Snowdon, the largest intrusion being that of Crib Goch, formerly considered to be an outlier of the Upper Rhyolitic Series. Both mineralogically and chemically, the acid intrusive rocks resemble the Snowdon rhyolites. Pre-cleavage sills of augite-dolerite and spilitic dolerite occur at several horizons, and present various biotite- and copper-rich modifications. The major folding is of north-east-and-south-west strike, and occurred almost wholly after the period of basic intrusions. Its dominant expression is the so-called 'Snowdon syncline,' the north-western limb of which lies in a recumbent position in the area immediately south of Rhyd-ddu. The major folding was succeeded first by a cleavage of similar strike, and afterwards by a minor folding and thrusting due to pressures directed south-eastwards, the thrusting being most pronounced along the recumbent limb of the 'Snowdon syncline.' Finally, the area was broken into blocks by faults, most of which belong to the same family of movements as those just enumerated, although some may have moved again during the Tertiary era.—Albert **Heard**: On Lower Old Red Sandstone plants showing structure, from Brecon (South Wales). A new fossil plant locality is recorded from the Senni beds in the neighbourhood of Brecon. A new Lower Old Red Sandstone plant, *Gosslingia breconensis*, is recorded; the plant is rootless and leafless, with stomata and hairs; gregarious, erect, dichotomously-branched, cylindrical stems arise from dichotomously-branched rhizomes with rhizoids; the stems are circinately coiled in the apical regions. The stele consists of a large strand of tracheids which have both spiral and reticulate thickening, surrounded by protoxylem and phloem; the outer cortex of the aerial stem consists of four layers of thick-walled cells. Reniform appendages borne on special branches are interpreted as sporangia. There is also a peculiar organism resembling Pachytheca.

Society of Public Analysts, December 1.—William G. **Savage**: Recent advances in the bacteriological examination of food and water. The four tests used to differentiate the high and low types of coliform organisms in water and their value as indicators of excremental contamination are discussed. As regards milk, the value of examining centrifugalised deposits for the tubercle bacillus is considered, and new tests for distinguishing pathogenic streptococci from those of bovine origin not injurious to man are described.—L. H. **Lampitt**, E. B. **Hughes**, and L. H. **Trace**: On the presence and detection of furfural in vinegar. In the distillation of malt vinegar or wine vinegar, furfural is produced by the acid hydrolysis of the pentosans contained in the vinegar. Added caramel in vinegar will only give the furfural it originally contained as such. A modified aniline acetate test has been devised wherein the rose-coloured furfuraniline is extracted by an immiscible solvent, amyl alcohol. Thus dark-coloured vinegar may be tested for furfural without distillation. The test is quantitative.—E. R. **Dovey**: The rapid determination of opium in stomach contents. A standard solution is made from ordinary prepared opium which has itself been standardised to contain 10 per cent. of morphine and 5 per cent. of meconic acid. A measured quantity of the stomach washings are treated successively with dilute hydrochloric acid, mercuric chloride solution, and ferric chloride solution, and the resulting colour is matched with that given by the standard under the same conditions. The mercuric chloride inhibits the formation of any coloration with thiocyanic acid in the opium.—C. H. **Manley**: A rapid method for the sorting of butters and margarines. The method depends upon the butyric acid content of butter fat. The filtered fat is saponified, the soap solution acidified with sulphuric acid, and the insoluble fatty acids filtered off under specified conditions. The excess of sulphuric acid in the filtrate is neutralised (methyl orange as indicator) and the titration with standard alkali continued to neutrality, with phenol phthalein as indicator. The difference between the result and that obtained in a blank test affords a measure of the soluble fatty acids. The neutral solution may be used for determining the Kirschner value.

CAMBRIDGE.

Philosophical Society, November 22.—H. W. B. **Skinner**: On the polarisation of mercury lines emitted from a discharge tube in a magnetic field.—C. F. **Sharman**: The application of the method of the magnetic spectrum to the study of secondary electronic emission. The relative merits of the method of retarding potentials and of the magnetic spectrum for the investigation of the energy distribution of electronic emissions are discussed. The latter method was used in the case of the secondary emission excited in metal surfaces by a beam of electrons with energies between 100 v. and 1000 v. With a copper target, the distribution curve is very nearly independent of the energy of the primary beam. The results are in general agreement with those obtained by means of retarding potentials; there is, however, a discrepancy in the position of the low energy peak as given by the two methods.—L. H. **Thomas**: The calculation of atomic fields. The effective field V inside an atom is assumed to be that due to the nuclear charge and to electrons distributed uniformly in the phase space of their motion in the field at 2 for each h^3 of phase space corresponding to closed orbits. Thus

$$\nabla^2 V = \frac{64\sqrt{2}}{3}\pi^2 \frac{e^{\frac{1}{2}}m^{\frac{3}{2}}}{h^3} V^{\frac{1}{2}}.$$

The fields so calculated agree well with those that have been constructed to fit X-ray data.—L. **Wertenstein**: A contribution to the theory of diffusion pumps. The mercury vapour stream in a diffusion pump carrying gas from the 'low pressure' side to the 'high pressure' side creates a pressure gradient which explains the working of the pump. The pressure gradient is given by a diffusion formula (Gaede, Hertz) or directly by a dynamical method (corresponding to the calculation of diffusion coefficients by dynamical considerations: Langevin, Chapman). The agreement is excellent for hydrogen, a little worse for air. Hence the final ratio of pressures on 'high' and 'low' pressures side of a diffusion pump must be higher when the diffusion coefficient is smaller, *i.e.*, that so far as final vacuum is concerned, the diffusion pump is more efficient for heavier than for lighter gases. This result seems at first in contradiction with the fact that the diffusion pump pumps out quicker the lighter gases, but it was found that, at the same temperature, carbon dioxide was removed more perfectly than argon, and argon than hydrogen.—W. **Burnside**: On a group of order 25920 and the projective transformations of a cubic surface.—P. A. M. **Dirac**: The Compton effect in wave mechanics.—J. B. S. **Haldane**: A mathematical

theory of natural and artificial selection. Part iv.—G. C. Steward: On the addition of the primary aberrations. In applying the characteristic function to particular optical systems three steps are necessary: the properties of the composite system must be examined in general, and then their dependence upon the corresponding properties of the component systems, and finally an examination must be made of the simplest components. The first and third of these have been undertaken elsewhere; a simple method is now given of achieving the second step—the method being applicable especially to the primary aberrations. Relations are obtained between the aberration coefficients of the composite system and the corresponding coefficients of the components.

LEEDS.

Philosophical and Literary Society, November 2.—P. K. Dutt: Anilopyrine and antipyrine (Preliminary Note). Anilopyrine alkohydroxides, in the absence of water, decompose spontaneously into 2-alkyl 5-pyrazolones, and a secondary amine. Further, the character of the substituents in position 2 and in the 5-amino group profoundly influences the yields of the two products. The fallacy of Michaelis's arguments in support of his bridge formula for anilopyrine is pointed out; there is no ground for discarding the anil structure of anilopyrine suggested by Stolz.—H. M. Dawson and C. R. Hoskins: Isohydric solutions and the velocity of chemical change. Measurements of the rate of reaction of acetone with iodine under the catalysing influence of isohydric solutions containing equivalent quantities of acetic acid and sodium acetate are in accord with the view that the reaction velocity corresponds with the sum of effects due respectively to the hydrogen ion, the hydroxyl ion, the acetate ion, and the undissociated acid. The proportion of the total effect attributable to the hydrogen and hydroxyl ions amounts to about 30 per cent. in a 0·005 molar solution, whereas this proportion is only about 0·2 per cent. in the case of a molar solution.—H. M. Dawson and L. H. Angus: The nature of solutions of the strong acids from the standpoint of the salt effect: the system nitric acid, sodium nitrate. The changes produced in the solubility of iodine in water by the addition of sodium nitrate can be expressed by an exponential formula $S = S_0 e^{-kc}$. When nitric acid solutions (1·3 N and 2·7 N) are substituted for water, there is no change in the nature of the salt effect. The observations support the view that nitric acid is an almost completely ionised electrolyte.—R. Whytlaw Gray and H. Whitaker: A new method of determining the vapour pressures of aqueous solutions. This consists in suspending a droplet of solution from a fine silica spiral microbalance and measuring its weight when it has come into equilibrium with a solution of known vapour pressure placed in the balance case. Preliminary measurements with droplets of solutions of sulphuric acid surrounded either with sucrose solutions or with partially dehydrated oxalic acid have shown that the method is capable of giving accurate results.—B. A. Burrell: Atmospheric pollution in Leeds, 1922–25.—E. Percival and H. Whitehead: Biology of the mayfly *Ephemera Danica*, Müll. Observations have been made on the conditions under which *E. danica* exists. The nymphs are largely confined to sandy deposits where the particles consist chiefly of the coarse and fine sand fractions. The insects are positively rheotactic, negatively phototactic, and, in the light, burrow rapidly. These responses, along with poor swimming powers, tend to limit the distribution of the animals to the sandy regions of streams. An attempt has been made to relate quantitatively the occurrence of these nymphs with their habitat.—J. H. Priestley: The relation of cork formation to the endodermis in the shoot of the dicotyledon. An account is given of the occurrence and distribution of the polyderm in the shoot of *Rubus Idæus*, and of the suberised layers in the stem of *Camellia japonica*. In the light of these facts the distribution of cork in Camellia, superficial below the bud scale scars and pericyclic elsewhere in the axis, and the extent of the formation of wound cork in both stems, becomes intelligible. No interpretation of the influence of suberised endodermal structures upon cork formation in the dicotyledon shoot will be possible except upon the basis of detailed studies of this type.

MELBOURNE.

Royal Society of Victoria, November 4.—O. W. Tiegs: Metamorphosis of insects. Different degrees of metamorphosis are exhibited by different groups of insects. In dragon-flies there is probably but little change; in coleoptera there occurs a partial tissue disruption, and a partial tissue rejuvenation; in muscid flies a very profound tissue disruption occurs; but the most profound metamorphosis yet described occurs in the chalcid wasp (Nasonia), where *every* specialised larval cell disintegrates at metamorphosis, and, after removal by phagocytes, or after simply dissolving in the blood, is replaced by imaginal cells. In Nasonia the death of the larval cells is not due to phagocytic action, but is a direct consequence of their enormous growth in size, increase in the size of the larva being the result, not of an increase in the number of larval cells, but of an increase in their volume.—A. J. Ewart and Lesley R. Kerr: Contributions to the flora of Australia (No. 32). The paper contains a number of additions to the flora of the Northern Territory. *Euphorbia petala* n. sp. is related to *E. ulsiniflora* and *E. Drummondi*; *Indigofera uncinata* n. sp. is a xerophytic adaptation of *I. australis*. *Eucalyptus Gillein* n. sp. from the summit of Mount Gillen is related to *E. Oldfieldii*; *Vellira prostrata* n. sp., while related to *V. perfoliata*, has the bracts practically free at the base instead of connate. The collection of abundant material of Ptychosema in all stages of development has made it clear that this genus, and also Lamprolobim, belong not to the Galegeæ but to the Genistæ.—J. M. Baldwin: The technique of the Nanson preferential majority system of election. This system of election, in contrast to other majority systems, fulfils the fundamental condition of majority representation, namely, that a candidate who could beat each of the other candidates separately must be elected. The technique evolved reduces the work of scrutineering to within practical limits. The technique developed has been tested in practice, the time for the tabulation being $Nn(n-1)/1000$ m hours (N voters, n candidates, m scrutineers). A method for reducing the number of candidates to ten is suggested which, while not rigidly accurate, is so unlikely to lead to error that the possibility may be neglected.

VIENNA.

Academy of Science, November 4 and 11.—J. Zellner, K. Knie, E. Rosenblüh, M. Stein, and J. Richling: Contributions to comparative vegetable chemistry (xv.). Chemistry of barks (fifth communication). Acer, Cratægus, Pavia, and Picea have yielded various substances, including ceryl alcohol, palmitic and stearic acids, invert sugar, tannins, etc.—J. Zellner, E. Huppert, R. Klapholz, K. Knie, O. Pollatschek, A. Spitzer, J. Richling, and M. Stein (xvi.): Chemistry of plants with milky sap. The

juices of seven species of the chicory family were found in qualitative agreement containing caoutchouc, two stearin-like alcohols, lactucerol and other substances.—E. Feyertag and J. Zellner (xvii.): *Rhododendron hirsutum*.—J. Zellner: Chemistry of halophytes. Those on the eastern shore of the Neusiedler See near Vienna are rich in sulphates.—R. Seka and O. Schmidt: Nitro-derivatives of dinaphthanthracene-diquinone and their transformations.

Diary of Societies.

SATURDAY, JANUARY 1.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. A. V. Hill: Nerves and Muscles: How we Feel and Move: (3) The Heart and some other Muscles.

MONDAY, JANUARY 3.

ROYAL GEOGRAPHICAL SOCIETY (at Æolian Hall), at 3.30.—F. Rodd: Camels and Caravans (Christmas Lecture for Young People).

VICTORIA INSTITUTE (at Central Buildings, Westminster), at 4.30.—Capt. T. W. E. Higgens: Man and his God: The Origin of Religion in the Gentile World as taught by St. Paul.

INSTITUTION OF AUTOMOBILE ENGINEERS (Western Centre) (at Merchant Venturers' Technical College, Bristol), at 6.45.—Prof. W. Morgan: The Optical Indicator as a Means of Examining Combustion in Internal Combustion Engines.

SOCIETY OF CHEMICAL INDUSTRY (London Section) (at Chemical Society), at 8.—J. H. Coste and Col. Butler: Modern Developments in the Treatment of Sewage.

ROYAL INSTITUTE OF BRITISH ARCHITECTS, at 8.—B. Anrep: Mosaics.

TUESDAY, JANUARY 4.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. A. V. Hill: Nerves and Muscles: How we Feel and Move: (4) The Lungs and Blood: How the Muscles get Air and Fuel.

INSTITUTION OF AUTOMOBILE ENGINEERS (at Royal Society of Arts), at 7.—Dr. B. A. Keen: The Place of the Tractor in Soil Cultivation.

ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN, at 7.—M. Adams Impressions of America and Canada—Photographic and otherwise.

HULL CHEMICAL AND ENGINEERING SOCIETY (at Hull), at 7.45.—G. H. M. Hutchinson: Refrigeration.

INSTITUTION OF AUTOMOBILE ENGINEERS (Coventry Graduates' Meeting) (at Broadgate Café, Coventry), at 7.45.—W. N. Haynes: Recent Developments in Motor Cycle Engine Design.

WEDNESDAY, JANUARY 5.

ROYAL SOCIETY OF ARTS, at 3.—Prof. C. R. Darling: The Story of a Wireless Valve (Dr. Mann Juvenile Lectures) (1).

PHILOSOPHICAL SOCIETY OF ENGLAND (at 138 Piccadilly), at 4.30.—Rev. J. B. Jaggar: The Philosophy of Faith.

GEOLOGICAL SOCIETY, at 5.30.—C. S. Elton: The Nature and Origin of Soil-Polygons in Spitsbergen.—Dr. F. Dixey: The Tertiary and Post-Tertiary Lacustrine Sediments of the Nyasan Rift-Valley.

ROYAL SOCIETY OF MEDICINE (Comparative Medicine and Tropical Diseases and Parasitology Sections), at 5.30.—Discussion on Trypanosomiasis in Man and Animals.

INSTITUTION OF ELECTRICAL ENGINEERS (Wireless Section), at 6.—G. H. Nash and others: Informal discussion on The Acoustic Problems of Microphones and Loud-Speakers.

INSTITUTION OF HEATING AND VENTILATING ENGINEERS (at Caxton Hall), at 7.—R. E. Herring: The Supervision during Erection and Maintenance of a Low Pressure Hot Water Heating Apparatus.

ROYAL MICROSCOPICAL SOCIETY (Biological Section).

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS (Middlesbrough Branch, Graduate Section) (at Middlesbrough).—C. Boast: Marine Condensing Plant.

THURSDAY, JANUARY 6.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. A. V. Hill: Nerves and Muscles: How we Feel and Move: (5) Nerves and Muscles Working Together.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—A. R. Cooper: Electrical Equipment of Track on the Underground Railways of London.

INSTITUTION OF THE RUBBER INDUSTRY (Birmingham and District Section) (at Grand Hotel, Birmingham), at 7.—A. W. T. Hyde: Physical Tests and their Significance.

SOCIETY OF CHEMICAL INDUSTRY (Bristol Section, jointly with Fuel Section) (at Bristol University), at 7.30.

SOCIETY OF DYERS AND COLOURISTS (West Riding Section) (at Bradford).—Prof. F. M. Rowe: Soledon Colours (SDC) and their Development on Cotton and Wool.

INSTITUTION OF MECHANICAL ENGINEERS (Manchester Branch) (at Manchester).—R. Potter: Pulverised Fuel.

FRIDAY, JANUARY 7.

ROYAL GEOGRAPHICAL SOCIETY (at Æolian Hall), at 3.30.—J. H. Reynolds: A Little Journey in the Kingdom of Iceland (Christmas Lecture for Young People).

INSTITUTION OF ELECTRICAL ENGINEERS (South Midland Centre) (at Engineering and Scientific Club, Wolverhampton), at 7.—W. Wilson: Electrical Research.

INSTITUTION OF MECHANICAL ENGINEERS (Informal Meeting), at 7.—Dr. C. H. Lander: Developments in the Carbonisation of Coal.

ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN (Pictorial Group), at 7.

PHOTOMICROGRAPHIC SOCIETY (at 4 Fetter Lane), at 7.—F. Martin Duncan: Notes on the Photography of Plant Tissues.

SOCIETY OF CHEMICAL INDUSTRY (Manchester Section) (at 16 St. Mary's Parsonage, Manchester), at 7.—Short Papers.

GEOLOGISTS' ASSOCIATION (at University College), at 7.30.

JUNIOR INSTITUTION OF ENGINEERS, at 7.30.—P. J. Haler: Distortion in Heat-treated Case-hardened Carbon Steels.

SATURDAY, JANUARY 8.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. A. V. Hill: Nerves and Muscles: How we Feel and Move: (6) Speed, Strength, and Endurance.

CONFERENCES.

ANNUAL CONFERENCE OF EDUCATIONAL ASSOCIATIONS (at University College).

Thursday, December 30, at 3.—Sir Henry A. Miers: The Choice of What is Good for Others (Presidential Address).

Friday, December 31, at 11.30 A.M.—Earl of Clarendon: Empire Settlement and Development.—King Alfred School Society, at 3.—J. Wicksteed: The Evolutionary Value of Co-Education.—Royal Drawing Society, at 5.30.—H. E. Peacock and P. Griffith: The Education and Development of Æsthetic Ability in Young People.

Saturday, January 1.—Educational Handwork Association, at 2.—J. H. Everett: The Teaching of Practical Elementary Science.—Leplay House, at 3.—Discussion: The Periodical Observation. Its Use for Observational and Regional Survey Work.—International Language (Ido), at 5.—G. H. Richardson: International Language: The Present Situation and the Prospect.

Monday, January 3.—Eugenics Society, at 11 A.M.—Prof. E. W. MacBride: The Nature and Origin of Racial Differences.—British Psychological Society (Education Section), at 6.—Discussion: S. J. F. Philpot, Miss Barbara Low, and others: The Cinema in Relation to the Mind of the Child.—British Association for Physical Training, at 5.30.—C. S. Thomson: Hygiene and Physical Training.

Tuesday, January 4.—School Nature Study Union, at 3.—Dr. E. J. Salisbury: Salt Marsh Vegetation.

Wednesday, January 5.—Society for Experiment and Research in Education, at 10.30 A.M.—J. H. Whitehouse and others: Creative Education.—Child Study Society, at 5.30.—Miss Lilian Barker: The Girl Delinquent.—British Esperanto Association, at 5.30.—Rev. Prof. T. G. Bailey: Esperanto in the World to-day.

Thursday, January 6.—National League for Health, Maternity, and Child Welfare, at 5.—Miss Gardner, Dr. R. J. M. Horne, and others: Discussion: Open Air Schools.—London Head Teachers' Association, at 5.—W. A. Brockington and Prof. Godfrey Thomson: Technique of Examination.

Friday, January 7.—British Broadcasting Company, at 11 A.M.—J. C. Stobart and others.

GEOGRAPHICAL ASSOCIATION (at London School of Economics, Houghton Street, Aldwych, W.C.2).

Thursday, January 6, at 11.30 A.M.—Major C. Patrick: Mapping from Air Photographs.—At 5.—Miss Eileen Power: Trans-Asiatic Caravan Routes in Ancient and Modern Times.—At 8.—J. Fairgrieve: Geography Teaching in Primary Schools.—Sir Henry G. Lyons: Geography in the Universities.

Friday, January 7, at 10 A.M.—Prof. H. J. Fleure: The Teaching of Geography.—At 11.45.—Sir C. F. Close: Population Problems of the Empire (Presidential Address).—At 2.—Col. Jack: The Work of the Ordnance Survey Department.

Saturday, January 8, at 10 A.M.—Prof. T. P. Nunn: Boy Scout Geography.—At 11.30.—Mrs. Ormsby: Regional Survey in a Large City.

JANUARY 3 AND 4.

MATHEMATICAL ASSOCIATION (Annual Meeting) (at London Day Training College).

Monday, January 3, at 5.30.—Prof. R. W. Genese: An Elementary Exposition of the Methods of Grassmann.

Tuesday, January 4, at 10.30 A.M. to 12.30.—Prof. M. J. M. Hill: The Teaching of Mathematics (Presidential Address).—Prof. A. Lodge: The Importance of including in School Work the Graphic Solution of Quadratic Equations.—G. Goodwill and others: Discussion on The Choice of Units in the Teaching of Mechanics.—A. C. Heath: On the Approximation to Irrational Numbers by Rationals.—At 2.30 to 4.15.—Prof. H. F. Baker: Can the Range of Geometry taught in Schools be Widened?—W. C. Fletcher: Geometrical Congruence.—A. T. Edwards and others: Discussion on The Relation of Art to Mathematics.

EXHIBITION.

JANUARY 4, 5, AND 6.

SEVENTEENTH ANNUAL EXHIBITION OF THE PHYSICAL SOCIETY AND THE OPTICAL SOCIETY (at Imperial College of Science and Technology, South Kensington), from 3 to 6 and from 7 to 10.

January 4, at 8.—Prof. E. N. da C. Andrade: Reproduction with Contemporary Apparatus, of a Physical Lecture of the Early Eighteenth Century.

January 5, at 8.—Dr. C. V. Drysdale: A Lecture on Progress in Electrical Instrument Design and Construction.

January 6, at 8.—J. L. Baird: A Lecture on Television.

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