Societies and Academies.

LONDON.

Royal Society, Feb. 21.—**P. Kapitza** : The change in electrical conductivity in strong electric fields (Parts 1 and 2). The change of resistance in a transverse field at temperatures of room, of solid carbon dioxide and ether, and of liquid nitrogen, has been studied in many metals. It follows the same law in all of them. The formula obtained gives a square law in weak fields and a linear law in stronger fields. Change of resistance follows a linear law with increasing field, but in weak fields it is masked by disturbances existing in the metal equivalent to an internal magnetic field. This additional resistance is independent of temperature, while the ideal resistance has a constant value for a given temperature for each metal, independent of its physical and chemical state. The additional resistance is identical with the residual resistance which is observed at very low temperatures. Supra-conductivity is a general phenomenon in all metals, but is masked by additional resistance, which disappears at very low temperature in certain metals. —**R. R. Nimmo** and **N. Feather** : An investigation of the ranges of the long-range a-particles from thorium C and radium C, using an expansion chamber. ‘Extrapolated’ ranges 9·90 and 11·70 cm. in standard air were obtained for the long-range a-particles from thorium C in the ratio of 1 : 5·1. 541 particles have been observed belonging to these groups. In addition, 9 had ranges between 12·5 cm. and 17 cm., and 13 had longer ranges. The range of the most abundant group of long-range a-particles from radium C was measured as 9·16 cm.; it is likely that there are others with ranges 8·1 cm., 10·0 cm., and 11·0 cm. respectively. Nearly 500 long-range particles from radium C were recorded.—**C. R. Burch** : Some experiments on vacuum distillation. The method of evaporative distillation can be applied to the derivatives of petroleum. An elementary kind of fractionation is possible. Petroleum derivatives of exceedingly low vapour pressure can be prepared.— **E. C. C. Baly** and **N. R. Hood** : The photosynthesis of naturally occurring compounds (4).—**B. W. Currie** and **R. Alty** : Adsorption at a water surface (1).— **W. G. Palmer** : Some adsorption isothermals for a plane platinum surface.—**B. Lambert** and **A. M. Clark** : Studies in gas-solid equilibria.—**G. C. Laurence** : Relative velocities of the alpha-particles emitted by certain radioactive elements.—**H. W. Thomson** and **C. N. Hinshelwood** : The mechanism of the homogeneous combination of hydrogen and oxygen.— **E. G. Dymond** and **E. E. Watson** : Electron-scattering in helium.—**E. T. Hanson** : Diffraction and resonance. —**S. Goldstein** : (a) The forces on a solid body moving through viscous fluid. (b) The steady flow of viscous fluid past a fixed spherical obstacle at small Reynolds’ numbers. Oseen’s equations for the flow of a viscous fluid at small Reynolds’ numbers past a fixed spherical obstacle are solved completely, and a table given of the resulting values of the drag coefficient.—**J. Taylor** : On the chemical interaction of ions, and the ‘clean-up’ of gases at glass surfaces under the influence of the electrical discharge.—**H. M. Macdonald** : The total reflection of electric waves at the interface between two media.—**L. Hartshorn** and **D. A. Oliver** : On the measurements of the dielectric constants of liquids, with a determination of the dielectric constant of benzene. An accuracy of 1 in 10,000 is obtained, using a capacity method. The method requires a comparatively large volume of liquid. For very pure liquids in small quantities, a comparison method is used. The dielectric constant of benzene is 2·2825 at 20° C., with a probable error of ± 2 parts in 10,000, mainly due to difficulties of obtaining a sample absolutely free from water.—**J. W. Fisher** : The wave equation in five dimensions.—**E. Griffiths** and **J. H. Awbery** : Measurements of flame temperatures. —**K. Lonsdale** : The structure of the benzene ring in $C_6(CH_3)_6$. The benzene ring in this compound is similar in shape and size to the six-carbon ring in graphite, the nuclear carbons having a diameter of 1·42 A. Three of the valencies of aromatic carbon are co-planar, the ring itself and all the side chain carbon atoms lying in the (001) cleavage plane. The puckered or ‘diamond’ type of benzene ring, and Morse’s model are inadmissible.

Geological Society, Feb. 6.—**E. St. J. Burton** : The horizons of Bryozoa (Polyzoa) in the Upper Eocene beds of Hampshire. Special horizons on which an abundance or deficiency of bryozoan remains occur are indicated within the three divisions of the Barton Beds (Lower, Middle, and Upper Barton). A recurrent facies of sedimentation may be coincident with the reappearance of species on higher horizons in the series.—**M. Black** : The upper estuarine series of Yorkshire. The Estuarine Series of Yorkshire is of deltaic rather than estuarine origin, and bears a close resemblance to the Coal Measures. The Upper Estuarine Series is best exposed in the coast-section between Gristhorpe and Cloughton (Yorkshire), where the sequence can be made out. It is possible to distinguish between autochthonous plant-beds and allochthonous, or drifted, ones. The former are rare in the Upper Estuarine Series. The drifted plant-beds are much better developed. Among these, a definite relationship exists between the type of sediment and the flora which it encloses. The plant-fragments seem to have behaved as a sediment transported by the water of the distributaries.

Society of Public Analysts, Feb. 6.—**T. P. Hilditch** and **Eveline E. Jones** : The fatty acids and component glycerides of some New Zealand butters. The procedure consisted in oxidising the butter fat by means of permanganate under conditions in which all unsaturated components were transformed into acidic products, whilst glycerides containing only saturated fatty acids remained unaltered. These fatty acids were recovered and their composition determined.— **A. Scott Dodd** : A new test for boric acid and borates. The pink coloration produced by adding mannitol and methyl red or sofnol indicator No. 1 to a neutral solution is characteristic of boric acid, a distinct reaction being obtained with so little as 0·2 mgm. The only substances causing any interference with the distinctness of the reaction are phosphates, arsenates, chromates, and tungstates, which make it difficult to ascertain the exact point of neutrality.— **B. E. Dixon** : The determination of small quantities of beryllium in rocks. The chief obstacle to the accurate determination of small quantities of beryllium in silicate rocks is the difficulty of separating it from titanium. This difficulty has been overcome by the use of p-chloroaniline, which will precipitate titanium completely.

DUBLIN.

Royal Dublin Society, Jan. 22.—**W. R. G. Atkins** and **H. H. Poole** : The photoelectric measurement of the illumination in buildings. The vertical illumination was measured simultaneously in an exposed position and in the building. The percentage ratio when the sun is obscured is called the ‘daylight factor.’ A dwelling-house and an old church were examined. The illumination in the former was less than 1 per cent

in most places, rising to 7 per cent just inside large windows, or 14 per cent with the photometer sloped towards the light. The factor in the church varied from 0·02 to 0·86 per cent, or, with sloped photometer, from 0·03 to 1·85 per cent. It seems to be futile to use special glass, transparent to ultra-violet light, in the usual type of dwelling-house in windows which do not, at some time of the day, receive direct sunlight.—H. H. Poole : A modified form of radium emanation apparatus. The apparatus in use in the Irish Radium Institute for pumping off emanation and drawing it into capillary tubes for therapeutic purposes has been modified so as to render its action more automatic, thus reducing the exposure of the operator to the radiations, and enabling the work to be carried on by a succession of less highly skilled workers than were required with the apparatus in its old form.

Royal Irish Academy, Jan. 28.—**P. J. Nolan** and **C. O'Brolchain** : Recombination of ions in atmospheric air (Part 1). Investigation of the decay coefficient by Schweidler's method. The linear recombination law for small ions in atmospheric air is verified. The recombination coefficient between small ions and nuclei is not constant. The variation does not appear to be connected with the concentration of dust particles in the air.—**P. J. Nolan** : Recombination of ions in atmospheric air (Part 2). The law of recombination of ions and nuclei. The relation between the rate of production of ions in atmospheric air and the equilibrium concentrations of small ions and nuclei is best represented by the equation $q = an^2 + \zeta n \sqrt{N}$ where $\zeta = 55 \times 10^{-5}$. The results of field observations generally support the proposed equation.

EDINBURGH.

Royal Society, Feb. 4.—**N. B. Eales** : The anatomy of a fœtal African elephant, *Elephas africanus (Loxodonta africana)* (Part 3). The contents of the thorax and abdomen, and the skeleton. A detailed specification of the Proboscidea is given, anatomical differences between *Elephas* and *Loxodonta* are noted, and the relationships between the Proboscidea and other orders of mammals are discussed. The group has numerous features of a primitive nature, in which it exhibits resemblances with the Rodentia, Sirenia, Hyracoidea and the Primates. The nearest relatives were the ancestors of the modern Sirenians.—**A. D. B. Smith** and **J. R. Brown** : Rôle of inbreeding in the development of the Jersey breed of cattle. Inbreeding has played a small part in the construction of the breed in England. Sewall Wright's coefficient now stands at only $3\cdot9 + 0\cdot3$ as compared to the Clydesdale breed of horses with 6 and Shorthorn cattle with 26. Cows with annual lactations of more than 1000 gallons in less than a year are significantly less inbred, having a coefficient of only 1·85. Possible reasons are : (1) miscellaneous inbreeding does not produce good results in yield ; (2) heterosis between two strains ; (3) inheritance of milk yield may not be in a common autosomal manner, but may be sex linked, in which case only certain types of inbreeding would be effective.—**A. W. Greenwood** and **J. S. S. Blyth** : An experimental analysis of the plumage of the brown Leghorn fowl. Whereas the plumage typical of the male is developed independently of the gonad and depends for its maintenance on a certain level of thyroid functioning, both gonad and thyroid play a part in regard to that of the female : the former stimulates the latter to a higher level of activity than that present in the male and so indirectly causes a hyperthyroid effect on the feathers. At the same time it modifies this condition by acting directly

on the feathers and restricting the deposition of melanin into pencillings.—**C. W. Stump** : A human blastocyst *in situ.* The blastocyst was obtained from the body of a woman aged forty-six years. It was fixed the day after the death of the mother, who was killed by a motor-car accident, but was slightly injured. Examination of the sections of the blastocyst and of the reconstructions made from the sections, place it in Bryce's group *D* of human blastocysts, which, now, with the addition of this new specimen, named H 381, and Stieve's Hugo specimen, includes thirteen blastocysts of relatively similar age.

GENEVA.

Society of Physics and Natural History, Dec. 6.—**Rolin Wavre** : The formula of Clairaut relative to geodesy. The author obtains Clairaut's formula by a method much simpler than those hitherto given. His calculation has the double advantage of not requiring the use of spherical functions and of making an approximation only at the last stage of the new and rigorous formulæ.—**Pierre Dive** : Internal movements of the terrestrial fluid. The author applies the formulæ recently established by him, on the laws of rotation of a heterogeneous fluid with a density increasing with the depth, to the case of the earth. Geophysicists admit that the continents should be considered as a light scoria floating on a denser viscous mass. The calculations of M. Dive give increases of velocity at a depth of 100 kilometres of 5·3, 7, 8·6, 9·5 cm. per second for surface densities of 3, 2·6, 2·5, 2·4 respectively. Of two continental masses floating in the viscous under-layer, the larger and more deeply submerged will be carried towards the east with a greater velocity. This movement is certainly much reduced by the viscosity, not taken into account in the calculations. This calculation gives a concrete and simple explanation of the tangential force which geologists have long considered as the principal factor in the deformations of the solid part of the globe.—**Adrien Jayet** : The age of the lower portion of the sub-lithographic limestones of the calcareous Alps of Haute Savoie. The lower part of these limestones, styled Senonian in the explanation of the geological map of France (1/80,000), merge laterally into fossil-bearing Cenomanian layers. Hence there is not, at the point where the latter are missing in the series, an interruption in the series. It is a matter of a lateral change of facies in a continuous sedimentary series.

VIENNA.

Academy of Sciences, Nov. 16.—**J. E. Hibsch** : The geological age of the sands and sandstones of the Bohemian Mittelgebirge, hitherto held to be Middle Oligocene.—**K. Menge** : (1) A theorem on the length of an arc.—(2) The general separation theorem. Nov. 22.—**W. J. Müller** and **O. Löwy** : The theory of passivity phenomena. (4) The dependence of the specific time of passivation for iron on the concentration and nature of the electrolyte.—**R. Dworzak** and **T. Lasch** : Cyclo-acetals.—**F. Heritsch** : *Michelinia Abichi* from the upper carboniferous of Nassfeld in the Carnic Alps.—**D. Poerner-Patzelt** and **A. Pischinger** : The behaviour of the structures of striated muscle fibres towards acids. Muscles of various sorts were used in acetate–acetic acid buffers and with known hydrogen ion content and afterwards examined microscopically.—**K. Przibram** : A colour change by pressure (piezochromy) in fluorite. Green fluorite powdered and then compressed at 10,000 kgm. per sq. cm. becomes violet.—**L. Kober** : Mesozoic breccias in the upper schist cap of the Sonnblick and Glockner group.