

## Societies and Academies.

LONDON.

**Royal Society, March 26.**—O. W. Richardson and T. Tanaka : Regularities in the secondary spectrum of hydrogen. It has been possible to arrange 123 additional lines provisionally in 22 series. Three of these form a PQR combination. The present indications are that the moments of inertia of the emitters are spread fairly well over a range extending from the high value deduced from the PQR combination found previously to a value somewhat below the lowest value which has been deduced from Fulcher's second band. This involves an extreme variation by a factor of almost six in the moments of inertia.—S. Chapman : The lunar diurnal magnetic variation at Greenwich and other observatories. The systematic changes of magnetic declination at Greenwich, during the course of the lunar day, have been determined from hourly records extending over 63 years. This and other magnetic elements have been similarly studied, using shorter series of data, for the observatories of Batavia, Zikawei, and Pavlovsk. The character and magnitude of the lunar daily changes depend on the following factors : the position of the sun relative to the moon, the position of the sun relative to the equator, the distance of the moon, the sunspot epoch, and the general state of magnetic activity upon the earth—the latter being connected with particular disturbed regions on the sun's surface. The lunar daily magnetic variation varies much less with sunspot epoch, and much more with the magnetic activity, than does the solar diurnal variation. It is concluded that the lunar influence on the earth's magnetic field, exerted through the agency of the lunar tide in the earth's atmosphere, is most efficient in the polar regions.—H. T. Flint : A general vector analysis with applications to electrodynamical theory. The vector analyses in use, as a rule, are concerned with quantities represented by straight lines, and the space to which they are applicable is Euclidean. An account is given of an analysis in which a vector is represented by

$$\delta a' = \sum_i^n \delta x^n.$$

The vector is of infinitesimal length and  $\delta x^n$  represents a component measured in any system of co-ordinates. In any kind of space, Euclidean or not, in which a point B has co-ordinates  $(\delta x^1, \delta x^2, \dots, \delta x^n)$  with respect to A we shall regard  $\delta a'$  as denoting a definite quantity, whatever the system of co-ordinates. In this space we shall suppose the geodetics unique and shall regard the geodetic arc joining A and B as the geometric representatives of the vector  $\delta a'$ . So far as possible the notation will be similar to that of Gibbs' vector analysis. The notation may be applied to space of any dimensions, but four-dimensional space is taken as fundamental. In many cases it is possible to employ a notation that leaves the formulæ of ordinary vector analysis almost unchanged, and formulæ of the restricted principle can be carried over to the general principle by merely applying rules of generalised vectors.—Miss M. O. Saltmarsh : The spectra of doubly and trebly ionised phosphorus (P III and P IV). The series system in the spectrum of doubly ionised phosphorus is a doublet system in accordance with the spectroscopic displacement law. Three members of the triplet series of the spectrum of trebly ionised phosphorus have been identified. For three groups of elements, each having its own characteristic electron structure, the sharp terms are greater than the diffuse terms with the same Rydberg number for the neutral and singly ionised element, but for higher stages of ionisation the diffuse terms are greater than

the sharp.—D. M. Wrinch and J. W. Nicholson : Laplace's equation and the inversion of surfaces of revolution.—T. R. Merton and J. G. Pilley : On experiments relating to the spectrum of nitrogen. When helium at about 30 mm. pressure containing a very small quantity of nitrogen is excited by feebly condensed discharges, the arc spectrum of nitrogen is developed, and under these conditions is completely isolated from the spark spectra. The arc spectrum of nitrogen is not developed in the presence of an excess of argon under the same conditions in which it appears in the presence of helium. Special precautions have to be taken to ensure the purity of the gases. When nitrogen is excited by electron impacts there appears to be a direct transition as the energy of the impacts is increased from the negative band spectrum to the spark spectrum, which would imply that the rupture of nitrogen molecules is generally into ions rather than neutral atoms.—T. H. Havelock : Studies in wave resistance ; the effect of parallel middle body. The ship is altered by inserting varying lengths of parallel middle body between the same bow and stern. The main problem is the study of the equivalent wave-making length of the ship, and its variation with velocity and with the length of parallel middle body.—T. Tanaka : Wave-lengths of additional lines in the many-lined spectrum of hydrogen. Some 560 new lines in the secondary hydrogen spectrum have been measured. Incidentally it was necessary to make measurements of a considerable number of lines in the oxy-hydrogen band spectrum.—H. S. Taylor : A theory of the catalytic surface. A catalytic surface seems to be composite, of atoms in varying degrees of saturation in a crystal lattice. The saturation varies from that in a plane surface to those which are only held to the surface by a single constraint. It is by this constraint that these outermost atoms differ from gaseous atoms. Thus several molecular species, for example, hydrogen and an unsaturated molecule, may be attached to the same atom of catalyst.—E. F. Armstrong and T. P. Hilditch : A study of catalytic actions at solid surfaces. Pt. XII. Some observations relative to those particles of a catalyst which participate in chemical change. The rate of decline of activity of several nickel catalysts in the presence of varying concentrations of impurities characteristic of natural fatty oils has furnished evidence supporting Taylor's hypothesis (*v. above*). The active nickel atoms seem to be actually detached from their neighbouring metallic atoms during the moment in which catalytic change is effected. Pt. XIII. Some factors controlling selective hydrogenation with particular reference to certain terpene derivatives. Whilst adjacent (conjugated) ethylenic linkages are converted completely to a saturated system, two separate ethylenic linkages are hydrogenated consecutively, one double bond disappearing completely before the other is attacked : acetylenic linkages are transformed to the saturated compounds with little or no production of the corresponding ethylenic compound. Similarly, the hydrogenation of esters or glycerides of polyethylenic higher fatty acids (but not the free acids themselves) is markedly selective, and the same applies to diethylenic derivatives of the terpene series. Selective hydrogenation, observed by ourselves and by Vavon, in compounds such as carvone, limonene, citral, geraniol, and linalool, is determined mainly by (i) degree of substitution of ethylenic carbon atoms, and (ii) proximity to one or other double bond of a carbonylic or hydroxylic group. It is also deduced from these results that citral, geraniol, and linalool all contain the grouping  $(\text{CH}_2)_2\text{C}=\text{CH}-$ . Selective hydrogenation is of considerable importance in relation to the general theory of catalysis at a solid surface.

**Royal Anthropological Institute, February 10.**—J. Reid Moir: Further discoveries of Early Chellean flint implements from the Cromer Forest Bed of Norfolk. The principal site investigated exists at East Runton, where, upon the foreshore exposed at low water, is a bed, averaging 18 inches in thickness, resting upon the chalk and very strongly impregnated with salts of iron. The deposit is being slowly broken up by modern sea action, and this results in the formation of a flint bed of a precisely similar character to that present upon the foreshore at Cromer. The accumulation represents in all probability the basal layer of the Cromer Forest Bed strata. From East Runton, Mr. Sairn of Cromer has found a number of Forest Bed mammalian remains, including *E. meridionalis*, *E. antiquus*, *Rhinoceros etruscus*, *Bison bonasus*, *Equus stenonis*, *Hyæna crocuta*, *Trogotherium cuvieri*, and numerous remains of the Cervidæ. The hand-axes recorded at East Runton and Cromer show that the pieces of flint from which they were made were struck off larger masses of flint, some of which were "prepared" by flaking beforehand. The evidence at East Runton establishes the fact of the occurrence of Early Chellean hand-axes in a bed at the base of the Cromer Forest Bed series of deposits, and beneath the glacial boulder clay of the Scandinavian ice-sheet, representing the second glacial period of East Anglia. It is highly probable that the specimens found upon the foreshore at Cromer were derived from a similar deposit to that still existing at East Runton.

February 20.—L. H. Dudley Buxton: The Stoney Indians of the Bow River, Alberta. The Stoney Indians are a branch of the Dakota Sioux, from whom they separated shortly before 1640. After leaving the parent stock they joined the Crees and gradually moved in a north-westerly direction. The reserve on which they now live lies on both sides of the Bow River, in southern Alberta, at an altitude of over 4000 feet above sea-level, in the foothills of the Rockies. The country is hilly and much of it is covered with grass and, in places, low scrub. The area of the reserve is just under 140 square miles, of which fifty acres only are cultivated. The total Indian population is just over six hundred. The Stoneys are divided into three bands, which are not endogamous, but the tribe, apart from a certain admixture of Cree blood, have kept themselves very much from outside contact. They are typical Plains Indians. They are very averse from agriculture, but hunt and trap at the right season and do a certain amount of trading. Although they are mostly nominal Christians, a number of the old customs, notably the Sun Dance, are still retained. The Stoneys seem in their physique to resemble closely the Siouan peoples to whom they are linguistically allied, but the most close resemblance is with the Blackfoot.

**Linnean Society, February 19.**—Miss A. Lorrain Smith: Templeton's drawings of lichens and fungi. John Templeton (1766–1825) was well known to the botanists of his day, more especially in Ireland. Taylor states in a note to the section *Lichenes* in the "Flora Hibernica" (1836): "The foregoing account of the lichens of Ireland would have been still more incomplete, but for the extensive collections of our lamented friend, the late Mr. John Templeton of Cranmore, near Belfast." Templeton entered on the scientific study of botany in 1790. His last paper seems to have been on peat-bogs, and was contributed to the Geological Society in 1821. Several manuscript volumes of his Hibernian flora with coloured drawings are preserved in the Belfast Museum.—J. Burt-Davy:

The tropical element in the arborescent flora of the Transvaal. The geographical distribution of 647 kinds of trees and allied shrubby plants was discussed. About 30 per cent. of these are endemic to the Transvaal and 70 per cent. are "wides." The percentage of endemics is only about two-thirds that of the endemics of all Transvaal phanerogams, suggesting that they represent types of vegetation older than many of the herbaceous types. Fully 90 per cent. of the wides are tropical or subtropical; the temperate element is very small. There is evidence in a limited area of the evolution of a recent warm-temperate flora (through recent elevation of the land-surface) replacing an older tropical and subtropical flora. Islands and reefs of older floras are left stranded where climatic conditions permit them to persist; these are not homogeneous, but represent different migration periods. Several cases are cited of strictly Northern Hemisphere genera migrating into South Africa, e.g. *Salix*, *Dianthus*, and *Juniperus*, none of which can have migrated from south to north. The highway of migration southward has been the great eastern mountain-range, owing to its favourable climatic conditions (relative absence of drought periods, etc.). The great central plateau has acted as a (recent) barrier to migration, probably owing to relatively low rainfall and periodic drought.—R. R. Gates: A virescent *Delphinium*. The numerous flowers showed little variation, the sepals were large and baggy, the spur of the posterior sepal being very short, forked at the tip, and very late in developing. The petals were very much reduced and without spurs or nectaries. The andrœcium was unaltered and the pollen normal. The carpels were long, curved, and without stigmatic surfaces. Virescence is frequently inherited as a Mendelian recessive, but often with complications, and the whole phenomenon deserves further genetic study.

**Geological Society, February 25.**—A. H. Cox: (1) The geology of Cader Idris (Merionethshire). Cader Idris is an escarpment of Ordovician igneous rocks south of the Harlech Dome. The strata have a general southward or south-eastward dip of about 40°, and the succession is given. The volcanic rocks have a much greater time-range than had been proved hitherto. The four volcanic groups are separated one from the other by sediments of thicknesses so considerable that each represents a distinct episode. The main structures have a north-east to south-west trend; but there is also a regular system of north-and-south minor folds that often cause a marked deflexion of outcrops. This minor folding was operative in pre-Ordovician, Ordovician, and post-Silurian times. (2) The dissection of pitching folds. By altering the inclination of the plane of dissection across a pitching fold, outcrops can be made to take any desired curve, either concave or convex. In a pitching anticline the curves will have a downward convexity when the inclination of the dissecting plane is less than the angle of pitch, but an upward one when the direction of inclination of the dissecting plane is opposed to that of the pitch. There must, therefore, be some intermediate position in which the outcrop "curve" is such that its projection on the map appears as a straight line, and the outcrop crosses the fold without apparent deflexion. Such deceptive projections are liable to occur in districts of high relief.

PARIS.

**Academy of Sciences, February 16.**—A. Lacroix: A new type of eruptive alkaline rock.—G. Kowalewski: Plane groups with two fundamental infinitesimal transformations.—Angelesco: Polynomials con-

nected with those of M. Appell.—André Roussel: Semi-continuity.—A. Alayrac: Study of the *vol plané* in a wind of oscillating direction and in an oscillatory wind of short period.—André Metz: The entanglement of the ether and the aberration of the stars. The conclusion is drawn that the aberration of the stars, as shown by experiment, is incompatible with the hypothesis of the entanglement of the ether by the earth.—Louis de Broglie: The natural frequency of the electron.—A. Marsat: The verification of reflectors for the projectors of motor-cars. A description of a rapid method for determining the dimensions of the caustic curves of reflectors.—A. Leduc: Molecular association and the equation of state of gases.—H. Buisson and C. Jausseran: The spontaneous reversal of the lines in the spectrum of neon. In a neon spectrum, lines which are simple when viewed through a short length of gas show reversal when viewed through a longer length. As a consequence of this spontaneous reversal, neon lines are not so useful in determining standards of length as has been supposed.—André Broca: The rational mounting of stringed instruments. Modifications in mounting are described which have been proved practically to lead to improved tone and quality.—Robert Castagné: The radioactivity of some springs of Alpine stations (Aix-les-Bains, Challes-les-Eaux) in the Pyrenees (Bagnères-de-Bigorre) and the Cévennes (Lamalou-les-Bains, Balaruc-les-Bains, Les Fumades) and of the natural gases of Vergèze (Gard), of Hérépien and Gabian (Hérault). The results of the measurements given show the high radioactive power of the large springs at Aix-les-Bains, the important radioactivity of the waters in the Pyrenees, and the feeble radioactivity of the springs in the Cévennes and on the Mediterranean coast.—René Audubert and Mlle. Marguerite Quintin: The mechanism of adsorption of ions.—F. Wandenbulcke: The rapid estimation of sulphuric acid in waters.—A. Kling and Mme. A. Lassieur: The separation of zinc and nickel by sulphuretted hydrogen. Since the presence of sulphuretted hydrogen interferes with the working of the hydrogen electrode, the quinhydrone electrode and with coloured indicators, it is necessary to remove this gas completely from solutions, either by boiling or by passing air, before determining the acidity. For the quantitative precipitation of zinc as sulphide without separation of nickel the  $P_H$  must be between 1.35 and 2.—Georges Denigès: The alloxantin reagent, of very general application, for ferric iron.—J. F. Durand and R. Naves: The action of hydrogen peroxide on the magnesium arylamines. By using an anhydrous ethereal solution of hydrogen peroxide, phenylhydroxylamine can be prepared from  $C_6H_5 \cdot NH \cdot MgBr$  with a yield of about 80 per cent.—Paul Jodot: Contribution to the petrographic study of *chailles*.—Jean Piveteau: The age of the lowest layers of the sedimentary strata of the south-west of Madagascar, between Onilahy and Mangoky.—J. Savornin: The cretaceous basin of the Haute-Moulouya.—R. Bureau: Atmospheric: their classification and their thermodynamical properties.—L. Lutz: The culture of Hymenomyces fungi in artificial media.—V. Vincent: The action of the carbonates of the alkalis and alkaline earths on the acidity of soils. The best substance for neutralising acidity in soil, in spite of its insolubility, is calcium carbonate, because it can be employed at any period without endangering the seed, and is also safer for light soils than quicklime.—Mlles. J. Lelièvre and Y. Ménager: The application to *L. flexicaulis* of the method of analysis by combustion.—L. Herrera: The presence of silica in incinerated histological sections. Remarks on a note by M. A.

Policard. Claim to priority.—A. Maubert, L. Jaloustre, P. Lemay, and G. Andreoly: The catalytic properties of bismoxyl. The tartrobismuthate of potassium and sodium precipitates the catalase of hepatic extracts: the precipitate formed shows great activity towards hydrogen peroxide.—A. Rochon-Duvigneaud, E. Bourdelle, and J. Dubar: Apparatus for the determination of the visual anatomical field by the method of the trans-scleral image.—E. Hédon: Life without the pancreas. The effects of the suppression of the treatment by insulin in the dog completely deprived of the pancreas: diabetic coma, its cure by sodium bicarbonate and insulin.—Raoul M. May: Relation of the nerves to degeneration and the regeneration of the gustative papillæ.—Jacques Pellegrin: African fishes of the family of the Phractolœmideæ.—R. Argaud: The nerve terminations in human cancer.—H. Bordier: Experiments in medullary radiotherapy. This treatment has produced marked improvement, and in some cases has cured infantile paralysis. The technique is given in detail.

## ROME.

Royal Academy of the Lincei, January 4.—V. Volterra in the chair.—B. Grassi: Androphilic and androphobic gnats of Legendre.—Alfonso Herrera: Photosynthetic theory of the origin of life and production of organic forms with metaformaldehyde. Under certain conditions formaldehyde undergoes polymerisation into metaformaldehyde, which separates in a pseudo-crystalline mass composed of microscopic cell-like and amœboid forms; the silica present as impurity in commercial formalin apparently plays a part in this phenomenon.—Ferruccio Zambonina and Guido Carobbi: Isomorphism between tervalent thallium and rare-earth metals. As would be expected from the atomic structure proposed by Bohr, the isomorphism existing between compounds of tervalent thallium and those of the rare-earth metals is of limited range.—G. Bisconçini: Imperfect flexibility of ropes.—Mario Crenna: Observations on the variations in the latitude of Campidoglio.—R. Magini: Behaviour of empty [so-called "sandwich"] cathodes in the electric discharge at low pressure.—Paolo Straneo: Expression of hereditary phenomena. Deformation of materials is discussed in relation to previous stresses.—Emanuele Quercigh: Bismuthinite. Crystallographic measurements of artificial crystals of bismuthinite lead to the axial ratios,  $a : b : c = 0.985 : 1 : 1.004$ .—Francesco Ranfaldi: Ethyl ester of phenyl-*p*-nitrocinamic acid. This substance forms crystals belonging to the prismatic class of the monoclinic system, the crystallographic constants being  $a : b : c = 1.65679 : 1 : 1.83480$ ,  $\beta = 69^\circ 29'$ ; Scacchi's results for the corresponding methyl ester are modified to:  $a : b : c = 1.82871 : 1 : 0.91775$ ,  $\beta = 69^\circ 29'$ .—Umberto D'Ancona: Investigations on the growth and sexual maturity of *Alosa finta* (Cuv.).—Primo Dorello: Function of the digitated glands in the genus *Helix*.—L. La Face: Observations on the nutrition of *Culex pipiens*.—Luisa Volterra: Further notes on the variability of the pelagic daphnias of Lake Nemi.—N. Passerini: Influence of the quality of the food on the growth of the larvæ, and on the metabolism, of *Tenebrio molitor* L.

## VIENNA.

Academy of Sciences, January 15.—L. Siegl: Communication from the Radium Institute, No. 174. The quantitative measurement of radium emanation in the guard ring plate condenser. In an attempt to make the radium standard and normal solutions superfluous, a measurement was made of the ionisation

