

Spring Gardens, on the evolution of epidemics. In June Dr. F. W. Mott, F.R.S., will give a course at the Royal Society of Arts, under the title of "Nature and Nurture in Mental Development." Among the lectures in contemplation for the provincial cities are those on the public milk supply—some criticisms and suggestions from the public health point of view—by Prof. Henry R. Kenwood, at Manchester, and on water supply, with exhaustive consideration of sources, collecting works, conveyance, and distribution, by Mr. E. P. Hill, at Birmingham. All the lectures will be free and open to the public, but will be of a character to attract post-graduate and advanced students of engineering, medicine, and other cognate sciences. The secretary to the trust, to whom all communications should be addressed, is Mrs. Aubrey Richardson, 8 Dartmouth Street, Westminster.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 16.—Sir Archibald Geikie, K.C.B., president, in the chair.—Lord **Rayleigh**: The effect of junctions on the propagation of electric waves along conductors.—W. B. **Hardy**: The influence of chemical constitution upon interfacial tension and upon the formation of composite surfaces.—Hon. R. J. **Strutt**: Duration of luminosity of electric discharge in gases and vapours.—Rev. P. J. **Kirkby** and J. E. **Marsh**: Some electrical and chemical effects of the explosion of azoimide. The experiments consisted in exploding azoimide gas (HN_3) at low pressures between two insulated coaxial cylinders, of gilded brass, connected to the terminals of a battery of about 105 volts. The quantity of electricity that reached one of the cylinders was measured by a ballistic galvanometer and compared with the quantity of gas exploded. The results show that, in every case, the number of molecules of gas exploded was more than 100,000 times the number of pairs of gaseous ions observed. This disproportion indicates that the atoms of the gas when separated by the explosion do not carry electric charges. The gaseous ions are probably produced by favourable collisions of free atoms in the process of forming the products of the explosion.—Dr. G. J. **Burch**: Negative after-images with pure spectral colours. The results obtained by Mr. A. W. Porter and Dr. Edridge-Green in their experiments on negative after-images and successive contrast with pure spectral colours (*Proceedings B*, vol. lxxxv., p. 434) can be explained in accordance with the theory of Thomas Young if the "stray light" referred to by the authors is taken into account. Thus fatigue by red light renders the blue and violet of a spectrum projected on a screen in an imperfectly darkened room darker and bluer along the line of the after-image, because it removes the red constituent of the "stray light" with which they are contaminated. The results of fatigue with other spectral colours may be similarly explained.—H. **Hartridge**: Factors affecting the measurement of absorption bands.—Dr. G. **Barlow**: A new method of measuring the torque produced by a beam of light in oblique refraction through a glass plate. According to theory, the torque produced on a glass plate by the nearly normal passage of a beam of light is directly proportional to the angle of incidence and always tends to turn the plate further from the normal position. The period of small torsional oscillations of a plate suspended by a quartz fibre should therefore be increased when the plate is traversed by the light. An experiment is described in which this change in period, actually an increase of about $\frac{1}{2}$ per cent., was measured. The observed change agreed within 3 per cent. with that calculated

from theory.—Dr. F. **Horton**: The positive ionisation produced by platinum and by certain salts when heated. The emission of positive electricity from platinum and from several samples of aluminium phosphate and of sodium phosphate has been investigated at different temperatures, observations being made of the variation of the emission with time and with the pressure of the surrounding gas.—Clive **Cuthbertson** and Maude **Cuthbertson**: The refraction and dispersion of the halogens, halogen acids, ozone, steam, oxides of nitrogen and ammonia, and the causes of the failure of the additive law. The refraction and dispersion of the elements and compounds named in the title have been determined between $\lambda=6708$ and $\lambda=4800$.—R. **Donald**: Liquid measurement by drops. To apply measurement by drops to various serological and bacteriological estimations of liquids and liquid suspensions, the author has worked out a system of using practically uniform easily-made pipettes of any size under any required constant pressure. The pipettes of suitably drawn-out glass tubing are simply gauged in, e.g. the Morse drill and wire gauge. The constant pressure is obtained by a column of mercury flowing as a piston to and fro in a suitable glass tube held at any required angle in a stand, or, for less exact work, in the hand.—Prof. W. H. **Young**: The new theory of integration. The present communication is a sketch of a mode whereby the modern theory of generalised, or Lebesgue, integration may be developed without the aid of the theory of sets of points.

Mineralogical Society, January 21.—Dr. A. E. H. Tutton, F.R.S., president, in the chair.—T. V. **Barker** and J. E. **Marsh**: Optical activity and enantiomorphism of molecular and crystal structure. The general nature of enantiomorphous structures accompanying optical activity in the liquid and crystalline conditions was discussed, and it was pointed out that, since the optical activity observed in crystals of six substances, including epsomite and sodium chlorate, cannot be referred to the crystal structure, it must be due to an enantiomorphous configuration of the atoms within the molecule. Suitable enantiomorphous configurations have been deduced on chemical grounds, the constitution of the compounds being based on a modification of Werner's theory of coordination. The symmetry of the new spatial formulæ is in many cases identical with the symmetry of the crystal, and, in particular, sodium nitrate can best be regarded as a racemate due to a mutual interpenetration of optical antipodes having spatial configurations similar to those suggested for the active forms of sodium chlorate, the symmetry of the double molecule being identical with that of a rhombohedron. The same type of molecular structure presumably exists in calcite and the rhombohedral form of sodium chlorate which crystallises at high temperatures. It is concluded that many cases of dimorphism are of an analogous character, and, more generally, that polymorphous change is preceded by a rearrangement of the atoms within the molecule.—H. **Collingridge**: Note on the determination of the optic axial angle of crystals in thin-section. In the case where one optic axis is visible in the field of view the position of the second axis may be determined more conveniently than in the Becke and Wright methods from the optic axial plane and the extinction direction through the centre of the field.—Dr. G. F. H. **Smith**: Graphical determinations of angles and indices in zones. Two methods were described, which, unlike the moriogram, are not restricted to right-angled zones. In one a double tangent scale is placed on a pencil of lines spaced as in a gnomonic projection on a zonal plane in such a way that the 01 and 11 lines cross the scale

at the given angles; the angles corresponding to any indices, or *vice versa*, are read off directly within the limits of the scale. In the second method a double diagram is employed, of which one-half is a new form of the moriogram, and the other is a representation of angles the cotangent of which is the difference of the cotangents of the given angles; the method is general and unrestricted in its application.—Dr. J. **Drugman**: The Goldschmidt apparatus for cutting models of crystals. The mechanism was described and the method of using it explained.—Prof. H. L. **Bowman**: A nodule of iron pyrites. The octahedral shape and the striations on the faces truncating the coigns of the tiny crystals point to their being pyrites and not marcasite, as usually stated.

PARIS.

Academy of Sciences, January 20.—M. F. Guyon in the chair.—A. **Lacroix**: The mineralogical and chemical constitution of the volcanic lavas of the centre of Madagascar. Analyses of twenty-seven typical rocks are given. The materials derived from the two volcanic centres are analogous but not identical.—Pierre **Duhem**: The adiabatic stability of equilibrium.—Paul **Sabatier** and M. **Murat**: Preparation of the three cymenes and the three menthanes. The ortho-, meta-, and para-dimethylcresylcarbinols were prepared by three different methods, these dehydrated by passing over thoria at 350° C., and the cresyl-propenes, $\text{CH}_3\text{C}_6\text{H}_4\text{C}(\text{CH}_3)=\text{CH}$, reduced with hydrogen in presence of nickel to the three cymenes, $\text{CH}_3\text{C}_6\text{H}_4\text{CH}(\text{CH}_3)_2$, and ultimately to the corresponding menthanes, $\text{CH}_3\text{C}_6\text{H}_{10}\text{CH}(\text{CH}_3)_2$. The physical properties of all these compounds are given.—Paul **Richer**: The identification of the supposed skull of Descartes by its comparison with portraits. The skull preserved at the museum corresponds very closely with the portrait of Descartes by Franz Hals.—Henri **Chrétien**: The general magnetic field of the sun.—G. **Fayet**: The next return of the Finlay comet; disturbance of the orbit due to the action of Jupiter. An approximate calculation of the orbit after passage of the comet within the sphere of attraction of Jupiter. In its changed position the conditions of visibility will be very unfavourable.—Georges **Giraud**: Certain functional equations and the permutable transformations.—M. **Nörlund**: The problem of Riemann in the theory of equations of finite differences.—Louis **Bachelier**: Semi-uniform probabilities.—Et. **Delassus**: The various forms of D'Alembert's principle, and the general equations of motion of systems submitted to linkages of any order.—M. **Mesnager**: A paradox of uniformly loaded rectangular plates.—E. **Fichot**: The production of static tides of the second kind in an ocean obeying any law of depth.—Vasilescu **Karpen**: The flight of birds without motion of the wings.—Émile **Borel**: The theory of relativity and kinematics.—C. **Danzere**: Isolated cellular vortices.—J. **Guyot**: Differences of contact potential between a metal and electrolytic solutions.—E. J. **Brunswick**: Predetermination of the characteristics of continuous-current dynamos.—A. **Leduc**: Latent heats of evaporation and maximum pressures. An application of the Clapeyron formula to the calculation of latent heats, the specific volume of the saturated vapour being calculated by methods previously described by the author. Figures are given for water, ether, and benzene; the deviations from the experimental results are considerable.—E. **Briner** and M. **Boubnoff**: Chemical reactions in compressed gases. Study of the decomposition of nitric oxide. The decomposition of nitric acid is accelerated by pressure. The products of the reaction at 300° under high pressure include

N_2 , N_2O , N_2O_3 , and NO_2 .—Victor **Henri** and René **Wurmser**: The law of elementary photochemical absorption. The law is enunciated that the photochemical susceptibility of a body depends on that part of the absorption spectrum which corresponds to the same molecular groupings as those on which the reaction is produced.—Daniel **Berthelot** and Henry **Gaudechon**: Action of the middle and extreme ultra-violet rays on ethyl aldehyde: acidification, polymerisation, resinification. In the absence of oxygen the ultra-violet rays cause a simultaneous oxidation and reduction. The production of the polymers, meta-aldehyde and para-aldehyde, and some aldehyde resin was also proved.—J. **Bougault**: Phenyl- α -oxycrotonic acid.—E. E. **Blaise** and E. **Carriere**: Succinic acid aldehyde. An attempt to clear up some discrepancies between the work of Carriere and that of Harries on the polymers of the acid aldehyde of succinic acid.—A. **Mailhe**: The nitro-derivatives of the oxides of orthocresyl and orthocresylene.—M. **Trabut**: The infectious chlorosis of the Citrus. This is transmitted by grafts, but numerous attempts to find a bacillus to account for the disease have proved fruitless.—M. **Chantemesse**: Preventive vaccination against typhoid fever in the navy. A comparison between vaccinated and unvaccinated persons, subjected to the same environment, shows that about 1 per cent. of the unvaccinated contracted typhoid fever, whilst not a single case occurred amongst the vaccinated.—M. **Rappin**: Antituberculous vaccination in the guinea-pig.—Raphael **Dubois**: Anæsthesia by the digestive canal. Anæsthesia caused by the rectal injection of chloroform ought to be rejected.—M. **Pezard**: Measurement of the reflex excitability of the spinal marrow and its variations under the influence of injections of solutions of calcium chloride.—Etienne **Rabaud**: The cryptocecidia of *Balanus nucum*, and the biological signification of galls.—A. **Labat**: The presence of bromine in the normal state in human organs. Bromine is normally present in the thyroid gland and in the urine.—Charles **Lepierre**: The non-specific action of zinc as a biological catalyser in the culture of *Aspergillus niger*. Its replacement by other elements. Cadmium has precisely the same influence as zinc in the growth of this mould.—Gabriel **Bertrand** and M. and Mme. **Rosenblatt**: The activity of Koji sucrose in presence of various acids.—R. **Fosse**: The formation of urea by two moulds. *Aspergillus niger* grown on a modified Raulin solution containing ammonium nitrate contains urea in its cells; *Penicillium glaucum* behaves similarly.—H. **Bierry**: The diastatic hydrolysis of glucosides and galactosides.

BOOKS RECEIVED.

Scottish National Antarctic Expedition. Report on the Scientific Results of the Voyage of s.y. *Scotia* during the Years 1902-3-4, under the Leadership of Dr. W. S. Bruce. Vol. vi., Zoology. Parts i. to xi., Invertebrates. By Dr. C. Vanev and others. Pp. viii+353+plates. (Edinburgh: The Scottish Oceanographical Laboratory; Oliver and Boyd.) 30s.

A First Book of Experimental Science. Arranged by W. A. Whitton. Pp. vii+137. (London: Macmillan and Co., Ltd.) 1s. 6d.

Das meteorologisch-magnetische Observatorium bei Potsdam. Pp. 81+plate. (Berlin: Behrend and Co.) 3 marks.

Terminologie der Entwicklungsmechanik der Tiere und Pflanzen. By Profs. C. Conrens, A. Fischel, and E. Kuster. Edited by Prof. W. Roux. Pp. xii+465. (Leipzig: W. Engelmann.) 10 marks.

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