finely divided blue gold suspended in the yellow solution.—Note on a new meteorite from Sacramento Mountains, Eddy County, New Mexico, by W. M. Foote. This was seen to fall in 1876. It weighs 237 kgr., and measures about 80 × 60 × 20 cm. It contains 91·39 per cent. of iron, and shows splendid etching figures.

Bulletin of the American Mathematical Society (December 1896).—Dr. W. J. A. Young reviews the "Introduction à l'étude de la Théorie des Nombres et de l'Algèbre supérieure," by Messrs. Borel and Drach. This is an interesting work founded on lectures by M. Jules Tannery. These lectures were delivered during the scholastic year 1891–2, before the students of the third year, in the École Normale Supérieure. Dr. Young characterises it as a book to be read and not to be used as a book of reference. The scanty table of contents offers but little assistance to one, who, without having read the book, or at least having familiarised himself with the details as to its contents, wishes to consult its pages on a specific question. It gives clear and concise outlines of general principles stripped of illustrations and amplification. One great blemish appears on the surface, for hardly any references are said to be given either to the original sources of the material used, or as guides to those who wish to study the subject further. Some of the references which are given are not as clear as could be wished: thus the proof of the proposition that every integer can be expressed as the sum of four or fewer squares, which is based on the properties of continued fractions, and which makes use of determinants, is assigned to Mr. Smith. To those who know this is, of course, the proof by Prof. Henry Smith. To add to the unsatisfactoriness, no indication is given of the way in which "Mr. Smith" expressed his proof. Many such blemishes (apparently) are to be met with, which mar a book of considerable value.—"Quaternions" is a highly commendatory notice of Prof. Hathaway's "Primary Quaternions," by Prof. J. B. Shaw.—Prof. Hathaway briefly discusses three recent text-books: viz. "Elements of Geometry," by G. C. Edwards; "Plane and Solid Geometry," by W. W. Beman and D. E. Smith; and "Plane and Solid Geometry" (suggestive method), by C. A. Van Velzer. Each book appears to embody some new and distinctive features.—Dr. G. A. Miller, in an article on several theorems of operation groups, continues his work on the lines of his recent contributions to the *Quarterly Journal of Mathematics* (vol. xxviii.).—"Numerically regular Reticulations upon Surfaces of Deficiency higher than 1" is a short note on a generalisation of Euler's relation for convex polyhedra, by Prof. H. S. White.—The usual interesting news, under notes and publications, closes the number.

Wiedemann's Annalen der Physik und Chemie, No. 1.—On the theory of stationary electric waves along wires, by P. Drude. Electric waves are not totally reflected by a bridge laid across the wire system. They undergo a displacement of phase and a diminution of amplitude, which depends essentially upon the ratio of the length of the bridge to that of the wave. Short waves, like those in water, are greatly damped by reflection. The absorptive power of a substance for electric waves may be measured by noting the number of nodes observable along the wire.—Treatment of high-tension accumulators, by L. Zehnder. The accumulators described by the author several years ago must not be charged by stronger currents than 0·1 ampere per cell. The creeping up of acid along the lead may be prevented by spreading the plates with vaseline while hot. The copper wires may be similarly protected from mercury by burning off the latter and covering with vaseline. An important precaution against the deterioration of the battery is never to leave the cells coupled in series or single. They should be connected in parallel when not in use.—Dielectric constants at low temperatures, by R. Abegg. The specific inductive capacities of all substances increase as the temperature falls, and it is possible to approach the high dielectric constant of water by cooling other dielectrics to low temperatures.—Magnetic induction of horizontal discs rotating in the earth's field, by F. F. Martens. Describes a new method of measuring magnetic hysteresis and viscosity, the disc being a limiting case of the ellipsoid of revolution.—Absolute thermal conductivity of air, by E. Müller. Investigates all the sources of error in the vacuum-thermometer method, and tests the variations used by Winkelmann and by Kundt, Warburg and Graetz. The former method was found unsatisfactory, and the latter, which eliminates radiation by determining it absolutely *in vacuo* and deducting it, gave values which are too small. Taking into account the residual mercury vapour and the newly-determined specific heat of the glass employed, the author finds the conductivity of air to be 0·000056 in C.G.S. units.—An attempt to separate the two constituents of cleveite gas by diffusion, by A. Hagenbach. Diaphragms of gypsum having been found unsatisfactory owing to contraction, compressed powdered graphite was used instead. The original density of the gaseous mixture being 2·315 (H = 1), that of the diffused gas was 2·032, and of the undiffused gas 2·576. The author believes that he has succeeded in a partial separation of the constituents of cleveite gas by this means.—Diffusion coefficients of some gases for water, by G. Hüfner.—Corresponding temperatures, by J. A. Groshans.—Elasticity and light, by P. Glan.

IN the *Journal of Botany* for December 1896, Mr. W. A. Clarke completes his "First Records of British Flowering Plants"; and two new species (?) of *Rubus* from Ireland are described by the Rev. W. Moyle Rogers. In the number for January 1897, Mr. W. P. Hiern gives a list of plants (flowering plants, Vascular Cryptogams, Muscineæ, and Fungi) gathered in the Isle of Man; Miss A. L. Smith describes some microscopic fungi new to or rare in Britain; Mr. J. Ll. Williams has an interesting note on the intoxicating effect produced on certain kinds of humble-bee by the honey of flowers belonging to the Compositæ and Dipsacaceæ.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, January 22.—Prof. Ayrton, Vice-President, in the chair.—Mr. Croft gave an exhibition of some simple apparatus. The exhibition included an ingenious form of clip to fit on an upright retort stand; a Nicol used for projecting the rings and brushes in crystals, with which it is sufficient to use the ordinary condenser of the lantern, the source of light having been moved further away from the lens than is usual; some photographs showing caustics, conical refraction, and diffraction; a stand for magnets, &c., when demonstrating the attraction and repulsion of poles; a stand for the suspension of objects for experiments on diamagnetism; a holder for X-ray tubes consisting of a spiral of wire fitting round the exhaustion tube of the bulb; an X-ray photograph taken by means of a Wimshurst machine; a model of Michelson's interference experiment; an arrangement to show subjective colours, in which a double lantern is arranged to give two partly over-lapping discs. A sheet of green glass is placed before one lantern, and the light of the other decreased till the illumination of the two discs is the same. The over-lap then appears white, while the remainder of the uncoloured disc appears red. Prof. Silvanus Thompson said he was surprised that "patent plate" was sufficiently good for Michelson's experiment. Had the author tried illuminating the discs, in his subjective effect experiment, for a very short interval, so that the eye should not have time to wander from one disc to the other? Mr. Griffith said that if you looked through a tube at one disc at a time, one appeared green and the other white. The Chairman said the point seemed to be, could you fatigue the eye simultaneously, or must it be successive? Prof. Silvanus Thompson said two common 1-inch microscope objectives were very suitable for projecting rings and brushes.—Mr. E. C. Baly read a paper on the passage of electricity through gases. In this paper, which is of a purely controversial nature, the author brings forward as arguments that electrical conduction in gases is not of an electrolytic nature the following: (1) That the sign of the change on the supposed gaseous ion is variable; (2) the initial resistance of a gas; (3) the invalidity of Ohm's law; (4) the permanence of the supposed gaseous electrolyte; (5) that every mixture of gases must equally be an electrolyte; (6) that the potential gradient in a vacuum-tube, when the current is passing, has been shown to be very uneven. It is very steep in the kathode glow, and is by no means a regular decline between the electrodes. Prof. Armstrong said it was difficult to know from what point of view the author had treated the question. The first part of the paper consisted almost entirely of a criticism of Prof. J. J. Thomson's theory and experiments. Prof. Thomson, however, is not the only observer who has dealt with this subject. The author's arguments seemed vitiated by the fact that he has looked upon the subject from one very narrow standpoint only, viz. the ionic hypothesis, and Lord Kelvin, for instance, does not believe in the truth of the ionic

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hypothesis even in the case of liquids. Prof. Thomson has shown that the phenomena depend on the dryness of the gas, so that the conduction cannot depend on the gaseous molecule alone. In the case of conduction induced by a neighbouring discharge, this might be due to the expulsion of condensed vapour from the walls of the vessel. It would appear that in the dry state gases are not electrolytes. Mr. Enright said he thought it was not correct to say no work was done in electrolysis. Prof. Silvanus Thompson said that the pursuit of the analogy between the conductivity in gases and liquids was apt to lead one too far. Thus, if you compare the conduction in a mixture of H and Cl with electrolysis, your analogy will be a false one unless you import into the term electrolysis the idea of chemical separation as taking place in the solution. If a current separated a mixture of powdered zinc and sulphur, it could not be called a case of electrolysis. Prof. Armstrong said an experiment of Prof. Dewar's was very instructive. He had shown that if you cool the surface of a Crookes' tube the discharge stops. It was quite inconceivable that at these low pressures the gas became liquefied, so that this experiment seemed to show that conductivity depends on the presence of a vapourous electrolyte. Mr. Enright asked if Prof. Armstrong knew how the presence of an electrolyte assisted conduction. In a communication, Prof. J. J. Thomson said that, in the decomposition of steam by a spark, the fact that in the tube as a *whole* the amount of steam decomposed is greater than the amount of gases liberated in a voltameter in series, was no objection to the conductivity being electrolytic. The only condition imposed by the laws of electrolysis was that the excess of H or O at one terminal, and of O or H at the other, should correspond to the amount of electricity passing through the tube. Thus, suppose in a water voltameter a number of metal partitions are fixed so that the current has to pass across these plates. Then at each plate H will be given off on one side and O on the other, and by making the partitions sufficiently numerous, the total quantity of gases given off for the passage of a given current may be made as large as we please. The excess at the terminals would not be affected at all by these partitions. In the experiments made by Mr. Rutherford and himself (Prof. Thomson), they did not observe any polarisation when the conductivity was produced by Röntgen rays. With reference to Mr. Baly's objections to the electrolytic theory: (1) There is no reason to think that, under conditions other than in solution, the atom of hydrogen may not have a negative charge. (2) The electrolytic theory leads us to expect that it would require a finite electromotive force to send a discharge through a gas. Before such a discharge can take place, the molecules must be split up, and this requires an electric field of finite strength. (3) In the case of a gas, the electric field has to ionise the molecules, so that an increase in the strength of the field will not only (as in the case of a liquid electrolyte) increase the speed of the ions, but it will also increase their number, and thus the current will increase faster than the electromotive force. (4) The ion once used can again combine, and, since the ionisation is done by the electric field, it can be again split up and used again. If, however, the ionisation has been done by external sources—as, for example, by Röntgen rays—then we find that the conductivity decreases as the current passes. (5) There seems to be no reason on the electrolytic theory why, in a mixture of HCl and Cl, some of the current should not go through the chlorine. (6) A variable potential gradient would be produced if the ions moved with different velocities. Mr. Baly's process in the positive column appears to be the same as on the electrolytic theory minus the atomic charges. In a communication Prof. Schuster said: Mr. Baly criticises what he calls the electrolytic theory, but directs his arguments against a form of the theory which is, as far as the writer knows, advocated by no one. Mr. Baly appears not to have read the original papers in which the fundamental points of the theory, upheld by J. J. Thomson and the writer (Prof. Schuster), are explained. If he had done so, he could not have given, as an objection to the theory, that the conductivity of a gas increases with the E.M.F. The essential difference between a liquid and a gas is that in the liquid the number of ions is fixed by the chemical constitution of the liquid, while in a gas dissociation has, first of all, to be produced by the current itself, and hence the number of ions depends on the current. In the paper referred to by Mr. Baly, in which the fact that when a spark is passed through a gas the gas ceases to insulate for some distance round the spark is described, the *explanation that this was due to a difficulty of passage of the* electricity from the electrode into the gas was especially disclaimed. The explanation given being substantially the same as that now given by Mr. Baly. Mr. Baly asks what becomes of the ions that are set free? The answer, of course, is that they recombine. The view that stratifications are due to compound molecules, and do not probably occur in pure gases is not new. With reference to the author's statement that "measurements made by Wheatstone and J. J. Thomson prove that the electricity travels along the positive column from the anode to the kathode, and that its velocity is about half that of light," Prof. Thomson's results show that the break-down of the insulating power of air takes place in the manner described, but this does not show anything as to what happens when the discharge has reached the steady state. Mr. Baly is quite wrong in the excess charges he assigns to different parts of the vacuum tube. Experiments on the excess charges can count for nothing, unless they are done with continuous currents. Mr. Baly is further wrong in stating that the fall of potential is rapid in the glow. On the contrary it is very small in the glow, being very rapid in the dark space between the glow and the kathode. Mr. Baly adopts Prof. Thomson's view as to the formation of molecular chains, but in a form very difficult to accept. The whole foundation of Mr. Baly's theory is upset by his wrong assumptions as to the excess charges in different parts of the tube. The author, in his reply, said that on some points he had been misunderstood. He thought that the increase in conductivity could not be due to vapour driven off from the sides, for ultra-violet light also produced such an increase. If Röntgen rays produce ionisation, then there ought to be a reduction in the density of the gas.

Chemical Society, December 17, 1896.—Mr. A. G. Vernon Harcourt, President, in the chair.—The following papers were read:—On the experimental methods employed in the examination of the products of starch-hydrolysis by diastase, by H. T. Brown, G. H. Morris, and J. H. Millar. From the results of a large amount of experimental work on starch-hydrolysis, the authors draw conclusions respecting the determination of solids from solution-density, the relation of $[\alpha]_j$ to $[\alpha]_D$, the determination of cupric reducing power, and discuss the limits of accuracy of the various methods.—On the specific rotation of maltose and of soluble starch, by H. T. Brown, G. H. Morris, and J. H. Millar. The specific rotation of 2 to 20 per cent. pure maltose solutions is constant, and at 15·5°, $[\alpha]_D$ = 137·93°; soluble starch in 2·5 to 4·5 per cent. solutions has, at 15·5°, $[\alpha]_D$ = 202·0°.—On the relation of the specific rotatory and cupric reducing powers of the products of starch-hydrolysis by diastase, by H. T. Brown, G. H. Morris, and J. H. Millar. The authors have established a definite relation between the specific rotation and the cupric reducing power of the products of starch-hydrolysis by diastase, which holds within very narrow limits.—The action of hydrogen peroxide and other oxidising agents on cobaltous salts in presence of alkali bicarbonates, by R. G. Durrant. Cobaltous solutions are turned green by hydrogen peroxide, hypochlorite, bromine, chlorine, or ozone in presence of alkali bicarbonates; the green colour is dependent on the production of a cobaltic salt and on the presence of carbonic anhydride.—Electrical conductivity of diethylammonium chloride in aqueous alcohol, by J. Walker and F. J. Hambly.—Formation of substituted oxytriazoles from phenylsemicarbazide, by G. Young and H. Annable. Substituted oxytriazoles are obtained when mixtures of phenylsemicarbazide with benzaldehyde, meta- or para-nitrobenzaldehyde, metatoluic aldehyde, terephthalic aldehyde, or cinnamic aldehyde are oxidised. — α-Bromocamphorsulpholactone, by C. Revis and F. S. Kipping. Under certain conditions an α-bromocamphorsulpholactone, $C_{10}H_{13}BrSO_4$, is formed during the sulphonation of α-bromocamphor.—Dimethylketohexamethylene, by F. S. Kipping.—The localisation of deliquescence in chloral hydrate crystals, by W. J. Pope. Great differences have been observed between the speeds of deliquescence of the various forms present on crystals of chloral hydrate.—Enantiomorphism, by W. J. Pope and F. S. Kipping. A preponderance of either right- or left-handed crystals of sodium chlorate is deposited on crystallising the material from aqueous solutions containing various optically active substances.

Linnean Society, December 17, 1896.—Dr. A. Günther, F.R.S., President, in the chair.—Messrs. James Green and J. H. Gardiner exhibited a series of sciagraphs of British batrachians and reptiles in which the details of the skeleton were very

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sharply defined, and its relation to the external outline well shown. These sciagraphs, as well as those of a series of mollusca also exhibited, were taken with a Crookes' tube of the ordinary focus pattern actuated by a powerful induction-coil giving 8-inch sparks, and the prints in every case were made from untouched negatives. Prof. Howes offered some remarks on the series of batrachians and reptiles, and Mr. B. B. Woodward commented upon the details of structure which were made apparent in the sciagraphs of mollusca.—Mr. J. E. Harting exhibited a supposed hybrid between the common brown hare (*Lepus timidus*) and the Irish hare (*Lepus variabilis*) recently obtained in Carnarvonshire, where the latter species had been introduced in 1878. He compared the specimen in question with examples of both the above-named species, and contrasted their distinguishing peculiarities, pointing out the intermediate characters exhibited by the supposed hybrid. His remarks were criticised by the President, who thought that too much stress should not be laid upon external appearance and colour; that the question of hybridity should rather be determined by comparing the relative measurements of the leg-bones; and that the Irish hare should be compared in detail with the hare of Southern Europe (*L. meridionalis* or *mediterraneus*). Prof. Howes drew attention to Nathusius's observations upon the Peyer's patches of the leporines, and pointed to the necessity for examination of the viscera. Mr. Barrett Hamilton, who was present as a visitor, was inclined to regard the supposed hybrid as an example of the ordinary brown hare turning white in winter, hitherto unnoticed in this country. Mr. Thomas Christy inquired what position the so-called Belgian hare or leporine occupied in relation to the question of hybridity; and was answered that the popular notion of that animal being a hybrid between hare and rabbit was fallacious, since it was nothing more than an overgrown tame rabbit coloured like a hare.—Mr. B. B. Woodward gave a demonstration, illustrated with lantern-slides, of M. F. Bernard's researches into the development of the hinge of bivalve shells.—On behalf of Dr. A. J. Ewart, a paper was read in continuation of one previously communicated by him and entitled "Further Observations on Assimilatory Inhibition."—Mr. W. C. Worsdell gave the chief facts of a paper dealing with the development of the ovule of *Christisonia*, a genus of the Orobancheæ. Referring to Prof. Koch's detailed account of the development of the ovule of *Orobanche* he remarked that *Christisonia* as a parasitic plant was of such interest and differed so much in its vegetative structure from *Orobanche*, that it seemed to be worth while to record the facts of its embryological development. A brief description of the vegetative parts of the plant was then given. The author also described the development of the embryo-sac and the embryo. This was shown to follow essentially the same lines as in *Orobanche*. Finally, it was pointed out that in a great many plants the vegetative and the reproductive organs have not always, by any means, a parallel development. A striking instance of this was to be seen in *Christisonia*. The paper was criticised by Dr. D. H. Scott, who testified to the importance and interest of some of the facts established.—On behalf of Dr. L. O. Howard, entomologist to the U.S. Department of Agriculture, a paper was read on the Chalcididæ of the Island of Grenada, West Indies. This paper, communicated by Mr. F. D. Godman, F.R.S., dealt with the Chalcididæ collected by Mr. H. H. Smith, under the auspices of the British Association Committee for investigating the fauna and flora of the West Indian Islands. The collection consisted of from 600 to 700 specimens, and comprised six new genera and seventy-two new species, which were described. The geographical relationships of the group were discussed.

Geological Society, January 6.—Dr. Henry Hicks, F.R.S., President, in the chair.—On the structure of the skull of a Pliosaur, by C. W. Andrews. The paper deals with a specimen of the Plesiosaurian known as *Pliosaurus ferox*, Sauvage, obtained by Mr. A. N. Leeds from the Oxford clay near Peterborough, and now in the British Museum, and perhaps the finest Pliosaur skull known. The author gave a detailed description of the skull which formed the subject of the paper.—On the Pembroke earthquakes of August 1892, and November 1893, by Dr. Charles Davison. In the part of the paper referring to the origin of these earthquakes and their connection with faults, the author pointed out the possible value of the study of earthquakes in supplementing geological surveys. For more than fifty years prior to the earthquakes of 1892-93, there appear to have been no slips of importance along the fault-system of the area. After this prolonged interval of repose, the earlier movements took place along transverse (north and south) faults, and the later along longitudinal (east and west) ones. The three faults of the latter series, which the author connected with the disturbances, lie successively one to the north of the other, as if the abrupt displacement of a rock-mass over one thrust-plane impelled the advance of those immediately below. There can be little doubt that the fault-slips of 1892 affected the conditions of stress along the neighbouring transverse fault, so that the displacements along it occurred earlier than they might otherwise have done. In the discussion that followed the reading of the paper, the President said that the author's inquiries into the relationship between earthquakes and faults were of great interest. It was well known that the older rocks in Pembrokeshire have been much crushed and broken, and that thrust-faults of great magnitude occurred there. The Rev. J. F. Blake remarked upon the apparent absence of any signs of disturbance on the surface. If these earthquakes were due to slips, it was strange that none of them should yield this evidence. In the cases previously described by the author the principal evidence was the association with well-known faults, which might be lines of fresh dislocation; but in the present instance faults had to be hypothecated. Though, therefore, the speaker believed the theory to be the true one, the evidence for it appeared extremely weak.—Changes of level in the Bermuda Islands, by Prof. Ralph S. Tarr. The author gave a summary of previous writings bearing upon the geology of the Bermudas; but his own researches point to a rather more complicated series of changes than those which have been inferred by other writers. The formation of the "base-rock" or "beach-rock" occurred at some period which cannot be accurately ascertained at present, owing to the fragmentary nature of the included fossils. It may have been formed in Pleistocene or even late Tertiary times. After its formation it was converted into a dense limestone and then eroded, probably by subaerial agents, and finally attacked by the waves at an elevation of at least fifteen feet above present sea-level; during this stage it was covered by beach-deposits of pebbles and shells, which were accumulated in a period so recent that the contained fossils are of the same species as the organisms living in the neighbouring sea. Then followed an uplift, during which land-shells lived on the beach-deposits; but these were soon covered by blown sand—the principal accumulations of the islands, and the outline of the islands was perfected by the action of the winds. This was done at an elevation which was at one time certainly as much as 40 or 50 feet above present sea-level. The author adduced evidence of a depression since this accumulation, causing land to disappear and the outline of the area to become very irregular; and he proves that these changes cannot be accounted for solely by erosion, as some have maintained. There are indications that the land is at present quiescent. It appears, then, that most of the work of construction of the Bermudas has been done in recent times (see NATURE, vol. liv. p. 101.)

PARIS.

Academy of Sciences, January 18.—M. A. Chatin in the chair.—Researches on helium, by M. Berthelot. Helium, in contact with mercury and benzene, is slowly absorbed during the prolonged action of the silent discharge. After the sparking has proceeded for some time, a fine orange glow appears, sufficiently bright to be visible in daylight, which examined with the spectroscope under ordinary atmospheric pressure shows the characteristic lines of helium and mercury, together with some hydrocarbon bands. At a red heat the resinous compound breaks up, reforming helium.—Remarks on the specific heats of the elementary gases, and on their atomic constitution, by M. Berthelot. In a *résumé* of the results obtained for the specific heats of the elementary gases, it is shown that these fall into four groups, comprising the monatomic gases, helium, argon, and mercury, diatomic gases other than the halogens, the halogens, and tetratomic gases such as phosphorus and arsenic.—Methods for comparing, with the aid of the electric spark, the times of oscillations of two regulated pendulums of nearly equal period, by M. G. Lippmann. The two pendulums are twice photographed by the sparks from a jar discharge at a known interval of time, and the exact phase of oscillation of each pendulum measured micrometrically upon the negative. The accuracy of the method is much higher than the method of coincidences.—Classification of the chemical elements, by M. Lecoq de Boisbaudran.—M. Potain presented a series of radiographs on behalf of M. Serbanesco, of subjects affected by gout or chronic

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rheumatism.—M. H. Lechappe gave further details of his apparatus for producing acetylene.—On an instrument for indicating ascending or descending movements in aerostats, by M. Aug. Coret.—New nebulæ discovered at the Observatory of Paris, by M. G. Bigourdan.—Observations of the Perrine comet (1896, December 8) made at the Toulouse Observatory with the Brunner equatorial, by M. F. Rossard.—On the first integrals of differential systems, by M. P. Painlevé.—On the poles of uniform functions of several independent variables, by M. Antonne.—On Taylor's series, by M. Eugène Fabry.—On the integration of the equation $d^2u/dt^2 = d^2u/dr^2 - u$, by M. Le Roux. The law of transparency of gases for the X-rays, by M. L. Benoist. Experiments on sulphurous acid, methyl chloride, and air show that the absorption is proportional to the density of the gas employed.—On the velocity of reduction of chromic acid by phosphorous acid, by M. G. Viard. The velocity of the reaction is given by $dx/dt = K(A - x)^4$, where x is the quantity of chromic acid reduced at the time t and A the initial quantity.—Action of hydrogen sulphide and hydrogen selenide upon phosphoryl trichloride, by M. A. Besson. With hydrogen sulphide in the cold the oxysulphide $P_2O_2S_3$ is formed in small quantity; at 100° the oxychlorosulphide $P_2O_2SCl_4$ is also found. The latter forms a colourless liquid distilling at 104° under a pressure of 10 mm. of mercury. Dry hydrogen selenide with excess of phosphoryl chloride gives HCl, P_2Se_5, and an oily liquid which gives with water metaphosphoric and hydrochloric acids.—On some salts and some derivatives of dinitro-orthocresol, by M. P. Cazeneuve. The potassium, ammonium, barium and calcium salts are described, also the acetyl and amido-derivatives.—Action of ethoxalyl chloride upon pseudocumene and mesitylene, by M. E. Bouveault. The reactions were carried out in presence of aluminium chloride, and follow the normal course.—On the diminution of the nitrogenous material in wheat from the department of the Nord, by M. Ballard.—On the influence of the section of the spinal medulla, in the cervical region, upon the repletion of the heart paralysed by electrification, by MM. J. L. Prevost and C. Radzikowski.—Influence of temperature and food upon the respiratory quotient of the moulds, by M. C. Gerber. The spores of *Sterigmatocystis nigra* were cultivated in Raulin's fluid, in which the only organic substance present was tartaric, malic, or citric acids, either alone or with saccharose in the proportions met with in fruit. The ratios of $CO_2 : O_2$ found were, 1·68 for citric acid, 1·76 for malic acid, and 2·47 for tartaric acid. The results are parallel to those obtained from fruits.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 28.

ROYAL SOCIETY, at 4.30.—On the Capacity and Residual Charge of Dielectrics as affected by Temperature and Time: Dr. J. Hopkinson, F.R.S., and E. Wilson.—On the Electrical Resistivity of Electrolytic Bismuth at Low Temperatures and in Magnetic Fields: Prof. Dewar, F.R.S., and Prof. Fleming, F.R.S.—On the Selective Conductivity exhibited by certain Polarising Substances: Prof. J. C. Bose.

ROYAL INSTITUTION, at 3.—Some Secrets of Crystals: Prof. H. A. Miers, F.R.S.

SOCIETY OF ARTS, at 8.—The Mechanical Production of Cold: Prof. James A. Ewing, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Electrical Interlocking, the Block, and Mechanical Signals on Railways: F. T. Hollins.

FRIDAY, JANUARY 29.

ROYAL INSTITUTION, at 9.—The Polarisation of the Electric Ray: Prof. J. C. Bose.

INSTITUTION OF CIVIL ENGINEERS, at 8.—An Experimental Investigation of the Efficiency of a Pelton Waterwheel: S. Henry Barraclough.

SUNDAY, JANUARY 31.

SUNDAY LECTURE SOCIETY, at 4.—Ancient and Modern Views of Fire: Dr. C. W. Kimmins.

MONDAY, FEBRUARY 1.

SOCIETY OF ARTS, at 8.—Material and Design in Pottery: Wm. Burton.

SOCIETY OF CHEMICAL INDUSTRY, at 8.

VICTORIA INSTITUTE, at 4.30.—Paper by Dr. J. D. Macdonald, F.R.S.

TUESDAY, FEBRUARY 2.

ROYAL INSTITUTION, at 3.—Animal Electricity: Prof. A. D. Waller, F.R.S.

ZOOLOGICAL SOCIETY, at 8.30.—General Account of his Expedition to the North Pacific: G. E. H. Barrett-Hamilton.—A Catalogue of the Reptiles and Batrachians of Celebes, with special reference to the Collections made by Drs. P. and F. Sarasin in 1893–96: G. A. Boulenger, F.R.S.—Further Contributions to the Knowledge of the Phytophagous Coleoptera of Africa, including Madagascar: Martin Jacoby.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Diversion of the Periyar: Colonel J. Pennycuick, R.E.—Cold Storage at the London and Indian Docks: H. F. Donaldson.

MINERALOGICAL SOCIETY, at 8.—On Altaite from Burma: Prof. Henry Louis.—On Nemalite from Afghánistan: F. R. Mallet.—Chemical Analysis of Derbylite: G. T. Prior.—Homogeneous Structures and Circular Polarisation: William Barlow.

WEDNESDAY, FEBRUARY 3.

GEOLOGICAL SOCIETY, at 8.—The Sub-genera Petalograptus and Cephalograptus: Miss G. L. Elles.—On some Superficial Deposits in Cutch: Rev. J. F. Blake.—Coal—A New Explanation of its Formation or the Phenomena of a New Fossil Plant considered with reference to the Origin, Composition, and Formation of Coal Beds: W. S. Gresley.

ENTOMOLOGICAL SOCIETY, at 8.—On Obscure and Little-known Microlepidoptera from the Collection of Mr. J. B. Hodgkinson: Mr. Tutt.—Seasonal Dimorphism in African Butterflies: Dr. A. G. Butler.

SOCIETY OF PUBLIC ANALYSTS, at 8.—The Composition of Meat Extracts and similar Products: Otto Hehner.—The Distillation of Formaldehyde from Aqueous Solution: Norman Leonard, Harry M. Smith, and H. Droop Richmond.—Some Analyses of Water from an Oyster Fishery; Remarks on Formaldehyde: Charles E. Cassal.

THURSDAY, FEBRUARY 4.

ROYAL SOCIETY, at 4.30.—The following Papers will *probably* be read:—On the Condition in which Fats are absorbed from the Intestine: B. Moore and D. P. Rockwood.—The Gaseous Constituents of certain Mineral Substances and Natural Waters: Prof. W. Ramsay, F.R.S., and Morris W. Travers.—Some Experiments on Helium: Morris W. Travers.—On the Gases inclosed in Crystalline Rocks and Minerals: Prof. W. A. Tilden, F.R.S.—On Lunar Periodicities in Earthquake Frequency: Prof. C. G. Knott.

ROYAL INSTITUTION, at 3.—Some Secrets of Crystals: Prof. H. A. Miers, F.R.S.

SOCIETY OF ARTS, at 8.—The Mechanical Production of Cold: Prof. James A. Ewing, F.R.S.

LINNEAN SOCIETY, at 8.—A Revision of the Tribe Naucleæ (Nat. Ord. Rubiacieæ): Dr. G. D. Haviland.—A Contribution to the History of New Zealand Echinoderms: H. Farquhar.

CHEMICAL SOCIETY, at 8.—The Oxidation of Nitrogen: Lord Rayleigh.—Researches in the Stilbene Series, I.: Dr. J. J. Sudborough.—Diortho-substituted Benzoic Acids, III.; Hydrolysis of Substituted Benzamides: Dr. J. J. Sudborough, Percy G. Jackson, L. L. Lloyd.—Apparatus for Steam Distillation: Dr. F. E. Matthews.—Oxidation of Sulphurous Acid by Potassium Permanganate: T. S. Dymond, F. Hughes.

INSTITUTION OF MECHANICAL ENGINEERS, at 7.30.—Fourth Report to the Alloy Research Committee: Prof. W. C. Robert-Austen, C.B., F.R.S.

CAMERA CLUB, at 8.15.—Flying Machines and Automatic Guns: Hiram Maxim.

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