

the University. The preamble of a statute providing that Greek should no longer be a compulsory subject in Responsions was promulgated in Congregation, and on a division was rejected by 188 to 152. The form of statute was introduced on behalf of council by Mr. Matheson and opposed by Dr. James, president of St. John's College, and formerly headmaster of Rugby. Sir W. Anson warden of All Souls', though not opposed to making Greek optional in certain cases, spoke against the proposal in its present form, a course which was also taken, on similar grounds, by Dr. Gilbert Murray, regius professor of Greek, and Mr. J. W. Mackail, professor of poetry. Mr. Cookson advocated the passing of the statute, and Prof. J. A. Smith argued on the same side. Mr. E. M. Walker opposed it. There is no doubt that the rejection of the preamble, which involves the loss of the statute, was largely due to the objection taken by Prof. Murray and the "moderate" party to the particular way in which the proposal had been framed. Rightly or wrongly, it was considered that no proper opportunity had been allowed for a fair discussion of possible limitations and alternatives, and the majority shrank from a measure that appeared to them unnecessarily drastic. Though for the present excluded by the vote of Congregation from the programme of university reform, it is not likely that the Greek question will be allowed to rest. But it must be remembered that, even if presented in a form acceptable to Congregation, the measure of relief has still to run the gauntlet of Convocation before becoming part of the statute law of the University.

It is announced that an Imperial Conference on Education is to be held in London next year, probably in April. The conference is, it is said, to take place at the invitation of the Imperial Government, and is to be regarded as an outcome of the congress held in 1907 under the auspices of the League of the Empire. Delegates are expected from Canada, Australia, New Zealand, South Africa, India, and the Crown Colonies.

THE U.S. General Education Board, says *Science*, has made conditional appropriations amounting to 145,000*l.*, distributed as follows:—Baylor University, Waco, Tex., 40,000*l.*; Trinity College, Durham, N.C., 30,000*l.*; University of Chattanooga, Tenn., 30,000*l.*; Meredith College, Raleigh, N.C., 10,000*l.*; Wesleyan Female College, Macon, Ga., 20,000*l.*; and Amherst College, Amherst, Mass., 15,000*l.* From the same source we learn that Wooster University has received 20,000*l.* from Mrs. J. S. Kennedy, of New York.

As has been stated in these columns, a Congress of the Universities of the Empire is to be held in London in 1912. On November 19 a meeting was held at the University of London, at which the Vice-Chancellors and other representatives of the universities of the United Kingdom were present for the purpose primarily of drawing up a paper of subjects for discussion at the congress. The subjects fell under the following heads:—(1) university organisation; (2) universities in their relation to teachers and undergraduate students; (3) universities in their relation to post-graduate and research work; (4) universities in their relation to schools and to other agencies for higher education. The draft agenda paper is to be sent at once to the various universities in the colonies and in India for comments and suggestions. The representatives of the Home universities will meet again early next summer to consider any representations made by the Colonial and Indian universities, and to select speakers to introduce the different topics to be discussed at the congress. It has been decided to hold the congress during the first week of July, 1912. We are glad to know that most of the universities throughout the Empire have accepted already the invitation to take part in what should prove an important and historic gathering. The secretary of the congress is Dr. R. D. Roberts, who may be addressed at the Congress Office, University of London, South Kensington, London, S.W.

LAST April Sir Henry Roscoe, F.R.S., as chairman of the Appeal Committee, made a public appeal for 70,000*l.* for providing new chemical laboratories at University College, London, including the purchase of the proposed

site in Gower Place. The death of King Edward led to the postponement of the Mansion House meeting arranged, and this necessity gave a check to the work of the committee. Sir Henry Roscoe has now made a second urgent appeal, which has two objects: the first is to raise a sum of 25,000*l.* for the acquisition of the proposed site, the second to raise 45,000*l.* to erect the laboratories. The sum of 25,000*l.* must be raised before December 25 next if the Senate of the University is to be in a position to exercise the option which it holds to purchase the site. Towards this sum the committee has collected more than 9000*l.*, leaving a balance of 16,000*l.* to be raised forthwith. The appeal is addressed especially to all those who realise the national importance of scientific research and its bearing upon the commercial prosperity of the country, to Londoners who desire to see university teaching in London developed in accordance with the needs of the nation, and also to the friends and admirers of Sir William Ramsay, the professor of general and inorganic chemistry at University College, to assist in this attempt to provide new chemical laboratories by gifts which will insure the acquisition of the site. It is earnestly to be hoped that the comparatively small sum of 16,000*l.* will be forthcoming before Christmas Day, so that the site adjoining the college, and eminently suitable for the proposed laboratories, may be secured. It may be pointed out that the number of students of chemistry at University College has increased greatly in recent years, and that the accommodation available has long been inadequate. The present laboratories were built in 1871, and to keep pace with modern requirements and to compete on something like equal terms with Continental universities a new building is required with up-to-date conveniences both for teaching and research. Donations should be addressed to Sir Henry E. Roscoe, F.R.S., at University College, Gower Street, London.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 17.—Sir Archibald Geikie, K.C.B., president, followed by Mr. A. B. Kempe, vice-president, in the chair.—Harold **Wager**: The effect of gravity upon the movements and aggregation of *Euglena viridis*, Ehrb., and other micro-organisms. *Euglena viridis* and some other micro-organisms, when placed in shallow vessels or narrow tubes in the dark, become aggregated into peculiar network-like patterns or more or less well-defined groups. In a narrow tube, placed horizontally in the dark, the aggregation takes the form of a series of groups which look like green bands crossing the tube from one side to the other. Each group shows a constant cyclic up and down movement, the denser central region moving downwards under the influence of gravity, and a lighter peripheral area consisting of organisms moving upwards, mainly by their own activity. The aggregation depends upon the number of organisms present, their activity, and the depth of the vessel in which they are contained, and may persist with its regular cyclic movements for several days. The downward movement appears to be a purely mechanical one, dependent upon the specific gravity of the organism, and is not due to a stimulus which evokes a physiological response, as in geotropism or geotaxis. The upward movement is, on the other hand, due partly to the activity of the organisms themselves, partly, no doubt, to the upward currents set up in the liquid by the friction of the downward-moving stream. The upward movement of *Euglena* is more or less vertical, and appears to be controlled, so far as the orientation of its elongate body is concerned, by the action of gravity. The aggregation resembles the cohesion figures produced when fine sediments are allowed, under certain conditions, to settle down slowly in a liquid, and are probably brought about much in the same way. The movements of certain micro-organisms are apparently controlled, therefore, in a purely mechanical fashion by gravity, combined with cohesive forces, and this is of advantage to species which, like *Euglena*, are often found in large numbers in a confined space, in that it prevents their accumulation in such dense masses as would be likely to interfere with their assimilatory and respiratory functions.—Miss Jean **White**: The

proteolytic enzyme of drosera.—L. S. **Dudgeon**, P. N. **Panton**, and H. A. F. **Wilson**: The influence of bacterial endotoxins on phagocytosis (including a new method for the differentiation of bacteria). Second report. The authors have failed to demonstrate in any of their experiments an action of the endotoxic substances on the leucocytes, and experiments leading to similar results were obtained by allowing bacteria to be exposed to the action of the specific endotoxic substances. They confirm the results published in the first communication, that the phagocytic result is dependent upon the interaction of endotoxin of serum. They have shown in the case of normal serum that the amount of phagocytosis permitted when bacteria and endotoxin interact is not related to the amount of hæmolytic complement present. The action of endotoxin appears to be specific even with bacteria so closely related as the typhoid and paratyphoid family. These results strongly suggest that this method can be employed for the differentiation of bacteria. The amount of endotoxin has been shown to be strongly thermostable.—S. B. **Schryver**: Some investigations on the state of aggregation of matter. Parts I.-III. *Part I. The action of salts in heterogeneous systems and the nature of the globulins.*—When complex substances, such as those which form colloidal solutions, enter into chemical reaction, the ordinary laws of chemical mass action are not always obeyed, the deviations therefrom depending upon the medium in which the reaction takes place. These are due to the adsorption of molecules from the medium on the surface of the large molecules of the colloid, which sterically inhibit chemical reaction. These conclusions were deduced chiefly by the study of the action of formaldehyde on Witte's peptone, whereby a methyleneimino derivative is formed, which readily, either by polymerisation or condensation between two molecules, forms an insoluble complex. The formation of this complex is inhibited by the presence of salts, the inhibitory action of a series of which has been quantitatively measured. The degree of inhibition was found to depend, in the case of monobasic sodium salts, on the physical properties of their aqueous solutions. The lower the surface tension and the lower the viscosity of the solutions, the greater the inhibitory action. The effect of surface tension could be deduced from the general study of adsorption phenomena, whilst the effect of viscosity could be deduced by the extension of the generalisations of Whitney and Noyes, and of Nernst as to the reaction rates in heterogeneous systems. The globulins, which are insoluble in water but soluble in salt solutions, are assumed to be complexes formed by the action of a basic group in one molecule with an acid group in another, by means of which a salt is formed, which undergoes slight but definite hydrolytic dissociation in the presence of water. In the presence of most salts, owing to adsorption by the dissociated globulin molecules, hydrolysis proceeds further than in presence of water alone, with the consequence that more globulin is dissociated and "dissolved." The solvent action of the salts here again depends upon the surface tensions of the solutions. Salts exert also a similar action in other heterogeneous systems in bringing about disaggregation, and the differences of solubility of various crystalline substances in salt solutions can be thereby explained. The physical constants of the salt solutions employed, and the solubilities of edestin and serum globulin in these solutions, are given. *Part II. The action of formaldehyde on Witte's peptone.*—The experimental details of this investigation are given. It is shown that the insoluble precipitate, formed by the interaction of the solutions, is derived chiefly from the more complex polypeptides. *Part III. The solubility of phenol and certain crystalline substances in salt solutions.*—The deductions as to the action of salts in heterogeneous systems are illustrated by the determination of the critical solution temperatures of phenol and salt solutions, which is a function chiefly of the surface tensions of the latter, and of the solubility of the following substances in salt solutions:—*d*-l-leucine, *d*-l-phenylalanine, caffeine, benzamide, and *p*-toluidine. The solubilities are affected by both the surface tensions and viscosities of the solutions.—F. W. **Twort**: A method for isolating and growing the lepra bacillus of man. Experiments were undertaken to obtain a method whereby the lepra bacillus of man and allied bacilli might be

cultivated outside the body on artificial media. The material tested was obtained from a typical leper. Cultivations were made on ordinary laboratory media and on media containing extracts from animal organs and tissues; these gave negative results. In view of the close relationship between the tubercle bacillus and the lepra bacillus, it appeared highly probable that these two micro-organisms would require the same chemical substances for building up their protoplasm which could be elaborated from the ordinary media only by the tubercle bacillus. It was thought that if these substances could be supplied already formed to the lepra bacillus it might grow, and the easiest method of supplying these substances would be by adding to some good medium the ground-up bodies of the tubercle bacilli containing them; accordingly a medium was made as follows:—egg three parts, 0.8 per cent. sodium chloride one part, ground tubercle bacilli 1 per cent., and glycerine 5 per cent. or less, mixed, placed in tubes, sterilised, and set in slopes. Leprosy material was placed in 2 per cent. ericolin to kill contaminating micro-organisms, and then inoculated on the tubercle medium. On this the lepra bacillus grew very slowly as a delicate, colourless streak along the inoculated track, and showed the typical morphological and staining characters of the lepra bacillus; the bacillus could be sub-cultured only on the tubercle medium. Experiments will be made to prepare a lepra vaccine and to grow the lepra bacillus of rat. In conjunction with Mr. Ingram, the author has also succeeded in growing the bacillus found in Jöhne's disease of cows. It grows on the same medium, much like lepra bacillus, but somewhat faster. It is hoped soon to prepare a diagnostic vaccine for Jöhne's disease.—G. J. **Fowler**, E. **Ardern**, and W. T. **Lockett**: The oxidation of phenol by certain bacteria in pure culture. The investigation described in the paper arose out of a detailed examination of the effect of various antiseptic substances, including phenol, in bacterial sewage filters. It was found that the phenol apparently exerted a selective action on the bacteria present in the filter, only very few types appearing in the filtrate, more especially a liquefying organism (*B. liquefaciens fluorescens*) and a chromogenic organism. Pure cultures of these organisms were made, the medium generally used being ordinary peptone broth. The general method of experiment was to bubble air, under sterile conditions, through an aqueous solution of phenol to which a few c.c. of the culture were added. The strengths of phenol solution used varied from 8.4 to 16.5 parts phenol per 100,000 of water, and were determined by the oxygen absorbed from standard acid permanganate solution in three minutes. It was found that *B. liquefaciens* had no action, or only a very slight one, on phenol, even after exposure of a month or more, while on introduction of the chromogenic organism the phenol content diminished, slowly at first, and then, in two or three days, completely disappeared. In a final experiment, a solution was made use of containing 10 parts per 100,000 of phenol, together with the following ingredients:—

Ammonium sulphate...	...	0.1 grm.	} per litre.
Potassium phosphate...	...	0.1 "	
Magnesium carbonate...	...	½-1 "	
in suspension.			

After careful sterilisation this was inoculated with the organism, and incubated. After nine days the phenol had practically disappeared. Plate cultures were also made at the expiration of this time, and showed no evidence of the presence of more than one species of organism. The organism has been examined by Dr. Sidebotham, who concludes that it most nearly resembles *B. helvolicus* (Zimmermann).

Mineralogical Society, November 15.—Prof. W. J. Lewis, F.R.S., president, in the chair.—J. H. **Collins**: Further notes on wood-tin. It is concluded that wood-tin, which always contains a good deal of iron oxide, and is much more opaque and more soluble than ordinary cassiterite, is the chalcodonic form, the shot-tin having had a concretionary, and the botryoidal form a stalagmatic, origin.—J. M. **Coon**: The alteration of the felspar of granites to china-clay. The action has taken place from within the earth towards the surface below the underground water-

level, the water outlets being generally indicated by schorl and quartz veins. The nature of the products of the alteration was discussed.—Prof. W. J. **Lewis**: Wiltshireite, a new mineral from the Binnenthal. The crystals were tin-white in colour, russet-brown when tarnished; small, but aggregated in parallel position, with monoclinic symmetry $a : b : c = 1.587 : 1 : 1.070$; $\beta = 100^\circ 44'$. Paucity of material prevented a chemical analysis, but no doubt it is a lead sulpharsenite. Named after the late Rev. Prof. T. Wiltshire.—Arthur **Russell**: A new locality of phenakite in Cornwall. A single specimen showing numerous colourless prismatic crystals of phenakite was found by the author at Wheal Gorland, Gwennap, Cornwall, this year. The specimen was obtained from a lode at present worked for wolfram and traversing the granite close to its junction with the killas.

Institution of Mining and Metallurgy, November 16.—Mr. Edgar Taylor, president, in the chair.—A. Moncrieff **Finlayson**: Secondary enrichment in the copper deposits of Huelva, Spain. This paper embodies the results of an investigation of variations in the ore-content of the lodes in the mining district named, with subsequent microscopic examination of the ores, with the view of determining the paragenesis of the minerals and the nature and extent of alteration. The following general conclusions were arrived at:—that the copper in the pyrites occurs primarily as a definite mineral (chalcopyrite), and is not chemically combined with the pyrite; that the order of deposition of the primary minerals was pyrites, chalcopyrite, blende, galena; that the processes of secondary enrichment consist, in lean ores, in a change from chalcopyrite to chalcocite, and in richer ores in a gradual aggregation of secondary chalcopyrite accompanied by chalcocite; that the preliminary changes due to enrichment extend to considerably greater depths than is indicated by the percentage composition of the ore. The characteristic process is undoubtedly the formation of chalcocite from chalcopyrite, chalcocite being formed, in part at least, during the oxidation of the leached heaps.—J. Bowie **Wilson**: Notes on the Mount Morgan ore deposits, Queensland. This paper is a brief account of the development of these deposits, brought up to date, the latest of previous technical papers on the subject being at least ten years old. Considerable space is devoted to a consideration of the geology of the deposit. The author considers that the deposit was formed in an area of country rock much shattered by intrusive dykes, which has allowed free circulation of ascending mineral-bearing solutions, the mineralisation occurring simultaneously with metamorphism of the original sedimentary rocks forming a background to the deposit. He admits, however, that there are several phenomena which do not absolutely fit in with his theory.—D. M. **Levy**: The successive stages in the bessemerising of copper mattes as indicated by the converter flame. This paper, which is accompanied by four coloured plates reproduced from Lumiere photographs, deals with the two main stages in the process of bessemerising copper mattes, the "slagging" stage, during which the iron-sulphide is eliminated, and the second stage, during which the sulphur is finally eliminated, the slag being poured off and the white metal blown up to blister copper. The colours of the flames at these two stages are characteristic, and there are other points, at first blowing and at the end of the slagging stage, when the flame colour is equally indicative of the stages reached in the complete operation. The author follows out the process in detail, and appends observations made during a typical "blow."

Royal Meteorological Society, November 16.—Mr. H. Mellish, president, in the chair.—Miss M. **White**: Results of the hourly balloon ascents made from the Meteorological Department of the Manchester University, March 18-19, 1910. Twenty-eight small rubber balloons carrying Dines's meteorographs were liberated hourly, and of these twenty have been recovered. The balloons left Manchester going at first in a southerly, and later south-easterly, direction, and were found in the Worcester, Hereford, and Monmouth districts, one reaching North Devon. The direction of the upper wind was constant during the period over which the ascents extended, and did not vary with height. The average height of the stratosphere was

10.7 km. Whereas at the ground level the temperature was remarkably constant throughout the course of the experiments, showing a maximum variation of fewer than 2° from the mean, the isothermals at the higher levels show a well-marked rise throughout the first fifteen hours; e.g. a temperature of -40° C. was at first encountered at a height of 6 km., but continued to recede, until at the end of twelve hours it was not met with until 8 km. height.—W. H. **Dines**: Results obtained from the registering balloon ascents carried out during the two international weeks, December 6-11, 1909, and August 8-13, 1910. Balloons on each occasion were sent up from Manchester, Pyrton Hill, Ditcham Park, Crinan in Scotland, and also in the west of Ireland. Seventeen records were secured in the December ascents, and these show that the value for the height of the isothermal column or stratosphere are some of the lowest ever observed, and the temperatures are perhaps the lowest ever recorded, at a height of 5 miles. Of the balloons sent up in the August week seventeen were found. The average height attained was about 10 miles. The inversion of temperature at the commencement of the isothermal layer was larger than usual.—C. J. P. **Cave**: Pilot balloon observations made in Barbados during the international week, December 6-11, 1909. These observations, which were undertaken at the request of the Royal Meteorological Society, were carried out by Mr. Radcliffe Hall and several other gentlemen associated with him. The prevalence of clouds during the daytime interfered with the ascents, many of the balloons being lost to sight after a few minutes. It seems that the wind behaves like an east wind in this country, increasing to a maximum and then falling off above.—W. **Marriott**: Three registering balloon ascents carried out at the Royal Agricultural Society's Show at Liverpool on June 21-23.—Captain C. H. **Ley**: The irregularities of the wind at moderate altitudes.

CAMBRIDGE.

Philosophical Society, October 31.—Prof. Hobson, vice-president, in the chair.—Sir J. J. **Thomson**: A new method of investigating the positive rays. In this method the rays are received on a photographic plate inserted inside the discharge tube, and placed in a light-tight case until it is wished to photograph the rays, when the plate is lifted from its case by a mechanism worked from the outside, and the rays are allowed to fall upon it. It is found that a photographic plate is very sensitive to the rays; a pencil of these only one-third of a millimetre in diameter gave a good photograph in less than five minutes. The photographic plate, besides being much more sensitive than the willemite screen hitherto used by the author, has the advantage of giving a permanent record and allows of greater accuracy of measurement. Using this method, the author has detected in the positive rays, in addition to the atom and molecules described in his paper in the October number of the *Philosophical Magazine*, positive rays of a secondary nature having values of m/e , 1.5, 2.5, &c., that for the hydrogen atom. Photographs taken by this method were exhibited at the meeting.—R. **Whiddington**: Preliminary note on the properties of easily absorbed Röntgen radiation.—R. T. **Beatty**: The ionisation of heavy gases by X-rays. When X-rays pass through matter their energy is absorbed in the production of δ , β , and γ rays. X-rays the absorption of which in aluminium ranged from $\lambda=230$ to $\lambda=4$ were passed through AsH_3 and SeH_2 , and the absorptions in these gases were measured. It was found that β and γ rays occurred together when the characteristic γ radiation of SeH_2 was excited. On subtracting the increase in ionisation due to these rays, the ionisation due to the direct formation of δ rays, relatively to the ionisation in air, remained constant for all the radiations used. It thus appears that the processes which go on when the characteristic radiation is produced do not alter the rate at which direct ionisation takes place in the gas. Incidentally, Lenard's law of absorption of corpuscular rays is confirmed to a few per cent.—S. G. **Lusby**: The mobility of the positive ion in flames. The mobility of the positive ions due to salt vapours in a flame was determined in these experiments. It was found that for all salts of all metals of the alkali and the alkaline earth groups this mobility was a constant

quantity, and at a temperature of 1500° absolute was 290 cm. per second. From a theoretical formula it was further deduced that the ion at this temperature had the mass of a hydrogen atom. Experiments are proceeding to test further this latter result.—G. W. **Todd**: Mobility of the positive ions in gases at low pressures. By an adaptation of Rutherford's alternating field method, the mobilities of the positive ions produced in gases by means of X-rays have been measured between pressures of 1 and 25 millimetres of mercury. Unlike the negative ions, no change was observed in the law that the product of the pressure and the mobility is constant for the same gas. Further experiments are in progress with the positive ions given off from aluminium phosphate.—G. H. **Hardy**: Fourier's double integral and the theory of divergent integrals.

PARIS.

Academy of Sciences, November 14.—M. Emile Picard in the chair.—The president announced the death of M. Tannery, free member of the academy.—M. L. Teisserenc de Bort was elected a member in the place of M. E. Rouché.—A. **Perot**: The spectroscopic measurement of the rotation of stars possessing an atmosphere, with special reference to the sun. A mathematical investigation showing that, in the absence of knowledge as to the true direction of the light ray at the point where it meets the reversing layer and of its propagation in the layers through which it then passes, caution is needed in translating radial velocities into velocities of rotation.—M. **Javelle**: Observations of Halley's comet made at the Nice Observatory with the Gautier equatorial of 76 cm. aperture. Observations are given for November 3, 8, 10, 11, and 12, together with the positions of the comparison stars. The comet was extremely faint, being reduced on November 3 to a vague white spot about 1 in extent, without visible condensation.—P. **Chofardet**: Observations of Cerulli's comet (1910c) made at the Observatory of Besancon with the bent equatorial. Data are given for November 10, 11, and 12. The comet appeared as a round nebulosity 30" to 40" in diameter, and was estimated to be of the eleventh magnitude.—M. **Coggia**: Observation of Cerulli's comet made at the Observatory of Marseilles with the Eichens equatorial of 26 cm. aperture. Data given for November 11.—Louis **Bachelier**: The movement of a point or material system submitted to the action of chance forces.—M. **Arnodin**: The bridge at La Cassagne (Gisclard system). An account of a suspension bridge of a new type constructed on the electric railway over the Pyrenees between Villefranche and Bourg.—Madame M. **Dussaud**: Discontinuous sources of light. A commutator is fixed on to the mechanism of a cinematograph in such a manner that the lamp is extinguished during the time that a forward step is made by the film, the latter being only illuminated when stationary. The advantages of this arrangement are enumerated.—Jean **Becquerel**: Polarised phosphorescence and the correlation between the polychroism of phosphorescence and the polychroism of absorption. An account of experiments on the phosphorescence of rubies at low temperatures (the boiling point of nitrogen). A change in the orientation of the exciting rays results, not in a change in the state of polarisation of each line, but a variation in the intensity emitted, and this variation may vary from one line in the spectrum to another. These results necessitate a modification of the views previously admitted.—A. **Cotton** and H. **Mouton**: The absolute measurement of the magnetic double refraction of nitrobenzene. Comparing the method previously described by the authors and that of Skinner on the same subject, a source of error has been discovered in the latter, and, allowing for this, both sets of measurements are in good agreement.—Edmond **Bauer** and Marcel **Moulin**: The blue colour of the sky and the constant of Avogadro. According to a theory of Lord Rayleigh, the blue colour of the sky is due to the dispersion of sunlight by the molecules of the air, and from this theory an expression is deduced giving the Avogadro constant N (the number of molecules in the gram-molecule), in terms of the ratio e/E (brightness of the sky to that of the sun), the dielectric constant of the air, the apparent diameter of the sun, and other measurable data. The measurement of the ratio e/E is the most

difficult, too large a value being found in the presence of large particles. An account is given of determinations of this ratio carried out in August, 1910, at the Vallot Observatory at the summit of Mt. Blanc. The weather was unfortunately unfavourable, but the figures obtained were of the same order as those of Rutherford and J. Perrin, based on different considerations. The results are favourable to Lord Rayleigh's theory.—A. **Lafay**: The inversion of the Magnus phenomenon.—F. **Michaud**: A capillimeter for the measurement of the surface tension of viscous liquids. The capillary tube is bent at right angles, and the horizontal portion placed just under the surface of the liquid. The liquid is brought to a fixed mark on the horizontal portion by the pressure of an indiarubber ball, and the hydrostatic pressure then measured.—L. **Grenet**: The tempering of bronze.—M. **Barre**: The double sulphates formed by the sulphates of lanthanum and cerium with the alkaline sulphates.—J. **Taffanel**: Safety explosives employed in mines. An account of experiments carried out at the testing station of the Central Committee of French Collieries. The results obtained showed the importance of freeing the hole from coal-dust before fixing in the cartridge; that paraffined paper as an envelope for the cartridge produced injurious effects was also made clear by these experiments.—A. **Besson** and L. **Fournier**: The reduction of phosphoryl chloride by hydrogen under the influence of the silent discharge. The main reaction is the formation of the oxide P_2O_3 , hydrochloric acid, and water.—Marcel **Delapine**: The action of pyridine upon the irido-disulphates.—G. **Guillemin** and B. **Delachanal**: Research on the gases occluded in the copper alloys. The metals examined included various kinds of brass, bronze, phosphor bronze, and tin, and the gases were only given up after fusion in a vacuum. Carbon dioxide and hydrogen were present in all the metals examined, methane and carbon monoxide being also present in the majority of cases.—G. **Darzens**: A new method for the preparation of the glycidic esters. Ethyl dichloroacetate and acetone react readily in benzene solution with magnesium, α -chlor- β -oxyisovaleric ethyl ester being formed. From this the theoretical yield of dimethylglycidic ethyl ester is readily prepared in theoretical yield by treatment with sodium ethylate.—Gabriel **Bertrand** and G. **Weisweiler**: The constitution of vicinose and vicanine.—Ch. **Mauguin**: Liquid crystals in convergent light.—Med. **Gard**: A hydrid of *Fuscus platycorpus* and *F. ceranoides*.—Lucien **Daniel**: A perennial bean.—Jules **Amar**: The working of the human machine.—A. **Fernbach** and M. **Schoen**: The influence exerted by the reaction upon certain properties of malt extracts. The extracts were made neutral to different indicators, and the resistance to the effect of a rise of temperature and the increase in diastatic activity after keeping were measured.—L. **Launoy**: The toxicity of some mineral and organic compounds of arsenic: effect of repeated non-toxic doses.—Louis **Léger**: The muddy taste in certain fresh-water fish.—J. **Deprat**: The tectonic of Yun-nan.—Th. **Giangeaud**: The western edge of the Montbrison basin.—F. **Grandjean**: A measure of the lamination of sediments (limestones and schists) by means of the tourmaline crystals.

NEW SOUTH WALES.

Royal Society, June 1.—Mr. H. D. Walsh, president, in the chair.—G. H. **Knibbs**: Note on the influence of infantile mortality on birth-rate.—L. **Cohen**: The determination of alkali in arsenical dip-fluids.—Prof. A. C. **Haddon**: Note on Mr. L. Hargrave's paper, "Lope de Vega."—T. Harvey **Johnston**: Australian avian entozoa.—T. W. **Keele**: The great weather cycle.

July 6.—Prof. T. W. E. David, F.R.S., president, in the chair.—A. **Duckworth**: The respective limits of Federal and State legislation in regard to companies.—J. H. **Maiden**: Records of the earlier French botanists, as regards Australian botany.—Dr. W. G. **Woolnough**: Stone rolls, in the Bulli coal seam of N.S. Wales.—Dr. J. Burton **Cleland** and T. Harvey **Johnston**: Worm-nests in Australian cattle due to *Filaria (Onchocerca) gibsoni*, with notes on similar structure in camels.—T. Harvey **Johnston** and Dr. J. Burton **Cleland**: The anatomy and possible mode of transmission of *Filaria (Onchocerca)*

gibsoni.—C. F. Laseron: Palæontology of the Lower Shoalhaven River.

August 3.—Prof. David, F.R.S., president, in the chair.—A. Duckworth: White Australia.—Dr. J. Burton Cleland and T. Harvey Johnston: The hæmatozoa of Australian batrachians, No. 1. In this paper the authors give a list of frogs which were searched for the presence of hæmatozoa. In ten species, represented by thirty-four specimens examined, the results were negative, while in three species, represented by seven specimens, blood parasites were detected. A hæmogregarine, *Haemogregarina (Lankesterella) hylae*, infesting *Hyla caerulea* is described as new, and a trypanosome from *Lymnodynastes tasmaniensis* and *L. ornatus*? is regarded as being similar to, though probably not identical with, *Trypanosoma rotatorium*.—E. C. Andrews: An excursion to the Yosemite, or studies in the formation of Alpine cirques, steps, and valley treads. In a previous report (corrosion by gravity streams) the writer gave a general account of stream corrosion. In the present paper a more detailed account is given of the origin of the cirque, and the "steps" and "treads" of Alpine Valley. A special application of the principle put forward is made to the case of the Yosemite and associated valleys in California.—T. Harvey Johnston and Dr. J. Burton Cleland: A note on the occurrence of pentastomes in Australian cattle. In a short note the authors deal with the finding of larval pentastomes (*Linguatula serrata*) in the mesenteric glands of a number of cows in the Illawarra district. The hosts were all affected with endemic hæmaturia, and the discovery of these parasites suggests that they may perhaps play a rôle of much economic importance.—H. G. A. Hardinge: The condition of the atmosphere during the recent proximity of Halley's comet. Analyses were made of the atmosphere collected at an elevated locality in the neighbourhood of Hornsby about a week previous to the supposed date of contact (May 19) until a week following that event. There were no appreciable differences noted in the composition of the air during the whole of this time, neither did spectroscopic examination reveal any peculiarities.

CALCUTTA.

Asiatic Society of Bengal, November 2.—Panchanan Neogi and Birendra Bhusan Adhichary: Reactions in presence of nickel. (a) Inability of nitrogen and hydrogen to combine in presence of iron and nickel. (b) Reduction of the oxides of nitrogen, sulphur, and phosphorus in presence of nickel. Johnson showed that nitrogen and hydrogen combine directly to form ammonia in presence of heated spongy platinum. This was contradicted by Wright, who showed that the ammonia obtained by Johnson was due to the reduction of traces of nitric oxide contained in nitrogen. Ramsay and Young showed that traces of ammonia are formed by the direct combination of nitrogen and hydrogen in presence of red-hot iron filings. The authors show, however, that the two gases do not combine at all, provided the nitrogen is rendered absolutely free from nitric oxide and iron from carbon. It has also been shown that ammonia is not formed by passing the mixed gases over heated nickel. It is further shown that nitric oxide, sulphur dioxide, and phosphorus pentoxide are reduced to the corresponding hydrides by means of hydrogen in presence of reduced nickel. The mechanism of the reactions has also been studied.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 24.

ROYAL SOCIETY, at 4.30.—On the Sequence of Chemical Forms in Stellar Spectra: Sir Norman Lockyer, K.C.B., F.R.S.—The Influence of Viscosity on the Stability of the Flow of Fluids: A. Mallock, F.R.S.—On Atmospheric Oscillations: Prof. Horace Lamb, F.R.S.—A Theory of the Chemical Action of the Electric Discharge in Electrolytic Gas and other Gases: Rev. P. J. Kirkby.—An Electrostatic Voltmeter for Photographic Recording of the Atmospheric Potential: G. W. Walker.—Optical Dispersion, an Analysis of its Actual Dependence upon Physical Conditions: Dr. T. H. Havelock.—The Spectrum of Halley's Comet: C. P. Butler.—A Geometrical Proof of the Theorem of a Double Six of Straight Lines: Dr. H. F. Baker, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Street Lighting by Modern Electric Lamps: H. T. Harrison.

FRIDAY, NOVEMBER 25.

PHYSICAL SOCIETY, at 5.—The Electric Stress at which Ionisation begins in Air: Dr. A. Russell.—The After-glow produced in Gases by Electric Discharge: Prof. the Hon. R. J. Strutt, F.R.S.—Exhibition of a Surface-

brightness Photometer: J. S. Dow.—The Approximate Solution of various Boundary Problems by Surface Integration combined with Freehand Graphs: L. F. Richardson.

MONDAY, NOVEMBER 28.

ROYAL SOCIETY OF ARTS, at 8.—Industrial Pyrometry: C. R. Darling. INSTITUTE OF ACTUARIES, at 5.—Inaugural Address by the President: G. H. Ryan.

TUESDAY, NOVEMBER 29.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—Certain Physical Characters of the Negroes of the Congo Free State and Nigeria: Dr. A. Keith.—The Search for the Original Home of the Maori: A. W. Newman. ZOOLOGICAL SOCIETY, at 8.30.—On a Possible Cause of Pneumo-enteritis in the Red Grouse (*Lagopus scoticus*): Dr. H. B. Fantham and H. Hammond Smith.—On the Alimentary Tract of certain Birds, and on the Mesenteric Relations of the Intestinal Loops: F. E. Beddard, F.R.S.—On the Specimens of Spotted Hyænas in the British Museum (Natural History): Prof. A. Cabrera.—The Development of *Solaster endeca* Forbes: Dr. J. F. Gemmill.

ROYAL SOCIETY OF ARTS, at 4.30.—The Progress and Prospects of Mining in Western Australia: A. Montgomery.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Further discussion: Portland Cement, and the Question of its Aeration: H. K. G. Bamber.

WEDNESDAY, NOVEMBER 30.

ROYAL SOCIETY OF ARTS, at 8.—Argentina from a British Point of View: Campbell P. Ogilvie.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.

THURSDAY, DECEMBER 1.

LINNEAN SOCIETY, at 8.—Spermatogenesis in *Stenobothrus*: Capt. C. F. U. Meek.—Reports on the International Botanical Congress at Brussels, 1910: Dr. Otto Stapf and others.

RÖNTGEN SOCIETY, at 8.15.—Osmotic Growths: Dr. Deane Butcher.

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