tions obtain which make a practical test more helpful. Nevertheless, the temperature is of great importance and many means are employed of lowering it, such as adding salts which absorb heat on volatilisation.

The rapidity of detonation, the length of the flame, and the heat evolved, all influence the readiness with which explosives ignite gas or coal-dust; but in this connection knowledge and progress have been chiefly promoted by direct experiment at the various testing stations here and abroad.

The filling material for shells has been the subject of much experiment and trial by the different countries. Picric acid, under the various names of melinite, lyddite, shimose powder, etc., has been extensively tried and found wanting. Ammonal, containing ammonium nitrate, with a large percentage of trinitrotoluol and finely divided aluminium, is a very safe and powerful explosive, and has been adopted as the charge for shells by the Austrian Government. It has the disadvantage of containing the hygroscopic ammonium nitrate as an ingredient, and must consequently be specially protected against moisture. At present, trinitrotoluol is the body which has commended itself to most of the Governments as the best bursting charge for shells, torpedoes, and general military blasting work, and has just been adopted by our own Government.

Experience in America, South Africa, and Australia has shown that the fruit-grower has a real friend in explosives, and it seems to me that, in this country also, we must wake up to this beneficent aspect of explosives and the means they offer of attaining results otherwise impossible.

In the case of tree planting, it is not the mere comparison of the cost of the excavation of the hole in which to place the tree which has to be considered. When an explosive is employed, the soil is shaken up and fissured for a comparatively wide area beyond the hole actually required for the tree. When, as often happens, there is a hard and impervious subsoil beyond reach of the spade, this is also opened and fissured, and experience has shown that trees planted in ground prepared by explosives make a much more vigorous and rapid growth than when planted in the ordinary way. Some trees have begun bearing after four years, while others similarly situated but spade planted did not yield fruit until six years.

In the case of existing orchards little can be done in the ordinary way to aerate or render the soil more pervious to the roots and moisture, but a small cartridge inserted at some depth below the tree, or a larger one exploded at a depth of 3 ft. or so below the surface and midway between trees planted about 15 ft. apart, has a most beneficial effect in loosening the soil without injuring the trees. The roots have less resistance to overcome, the soil is aerated, the moisture retaining properties improved, and a new lease of life is thus given to an old orchard; the trees become more vigorous and productive, and indeed are rejuvenated.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LEEDS.—The following appointments have been made:—Mr. Howard Priestman to be lecturer in textile industries; Dr. A. M. Pryce to be demonstrator in bacteriology; Dr. H. E. Woodman to be research assistant in animal nutrition; Mr. H. A. Wyllie to be additional assistant lecturer and demonstrator in agriculture.

The second annual Yorkshire Summer School of Geography will be held at Whitby on August 3–22. The work of organisation has again been undertaken by the University of Leeds, and the director of the school will be Prof. Kendall. The special subject this year will be the British Isles, treated in a general course, dealing with land forms and structure, meteorology and economic geography. There will be alternative courses at the choice of each student on (1) agriculture, rocks and soils, and (2) oceanography, rivers and river development, and the evolution of transport. As in last year's course, special attention will be paid to practical and field work.

LONDON.—The council of Bedford College has made the following appointments:—Assistant-lecturer in mathematics, Mr. C. Clemmow; demonstrators in physiology, Miss G. Hartwell and Miss N. Tweedy; demonstrators in chemistry, Miss E. Field and Miss B. M. Paterson; demonstrator in geology, Miss I. Lowe.

DR. F. R. MILLER, of the department of physiology, McGill University, Montreal, has been appointed professor of physiology in the Western University, London, Canada.

THE distribution of prizes at the Horticultural College, Swanley, Kent, will be held on July 23. The prizes will be presented by Lady Reid, and Sir George Reid, G.C.M.G., High Commissioner for Australia, will give an address. The chair will be taken at 4 p.m. by Sir John Cockburn, K.C.M.G.

THE governors of the Imperial College of Science and Technology have appointed Dr. A. N. Whitehead, F.R.S., to the newly constituted chair of applied mathematics, and Dr. C. G. Cullis to the professorship of economic mineralogy. These changes form part of the general scheme of development of the Imperial College "for the provision of the fullest equipment for the most advanced training and research in various branches of science, especially in its application to industry."

THREE issues of the *Undergraduate*, the University of London magazine, published by the Students' Representative Council, have been received. The first issue announced in December last that four numbers of the magazine would be published during the current session, and gave the last day for receiving contributions for the next issue as "19th January, 1914." Yet the second number bears the date May, 1914, and it says nothing of the number of issues during the session. The third issue is dated July, 1914. Sir Henry Miers writes in the December issue:—"A magazine which will represent the University as a whole, and will give to all its members a medium of free expression upon the numerous and increasing matters of University interest will . . . satisfy a very real need." We trust that the magazine will meet with the success to which the variety and interest of its contents entitle it.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 25.—Sir William Crookes, president, in the chair.—Sir W. **Crookes**: The spectrum of elementary silicon. The author has tried in vain for years to get pieces of fused silicon in an approximate degree of purity. Lately the Carborundum Co. at Niagara Falls sent him three samples giving an analysis of 99·56, 99·86, and 99·98 per cent.

of silicon, the impurities being titanium, iron, and aluminium. This material has been used in the present research. The paper gives a complete list of silicon lines from λ 2124·163 in the ultra-violet to λ 6371·032 in the extreme red, with some remarks referring to missing or doubtful lines.—Prof. S. P. **Thompson**: Note on Mr. Mallock's observations on intermittent vision. In his paper of December, 1913, on intermittent vision, Mr. Mallock discussed the phenomena observed when a rotating disc of twelve black sectors painted on a white ground is viewed while a slight mechanical shock is given to the body or head. He concluded that a mechanical acceleration imparted thus to the nerve structures on which vision depends produces a momentary periodic paralysis. The author, repeating Mr. Mallock's experiments, finds that effects of precisely the same kind appear when, on viewing the rotating sector disc in a mirror mounted elastically on a support, slight mechanical shocks are given to the mirror instead of to the observer. He therefore attributes the effects, both in Mr. Mallock's original experiments and in his own, to momentary minute displacements of the image on the retina, stimulating rods and cones which are relatively unfatigued and which therefore are momentarily of greater sensitiveness.—T. R. **Merton**: Attempts to produce rare gases by electric discharge. An investigation has been made of the apparent production of neon and helium by electric discharges in vacuum tubes. An apparatus has been designed in which protection from atmospheric contamination can be secured by a mercury seal throughout the experiment. It has been found that the presence of argon in the residual gases furnishes an exceedingly sensitive test for atmospheric contamination, and that a mercury seal can only be relied on if precautions are taken to ensure that the mercury and glass are scrupulously clean. The author has not been successful in reproducing the conditions necessary for the production of neon and helium.—A. C. G. **Egerton**: The analysis of gases after passage of electric discharges.—C. T. **Heycock** and F. H. **Neville**: Dilute solutions of aluminium in gold.—Prof. F. G. **Donnan** and G. M. **Green**: The variation of electrical potential across a semipermeable membrane.—J. H. **Jeans**: The potential of ellipsoidal bodies and the figures of equilibrium of rotating liquid masses. Sir G. Darwin was convinced that the pear-shaped series of figures of equilibrium discovered by Poincaré was initially stable, while M. Liapounoff had with equal conviction announced that it was unstable. The present investigation was undertaken primarily in the hope of deciding between these two views. The main conclusion arrived at is somewhat disappointing. It is that, in spite of the labours of Poincaré, Darwin, and Liapounoff, we have still no definite knowledge as to the stability or instability of the pear-shaped figure. All these investigators have worked at the question of the stability of the pear-shaped figure carried so far as the second order of small quantities. The present paper indicates that, so far as second-order terms, there is a doubly-infinite series of such figures which can, of course, be broken up into linear series in as many ways as we please. So far as can be seen, Sir G. Darwin has concerned himself with only one of these series, while M. Liapounoff has presumably dealt with a different series. It appears that the true linear series demanded by the general theory of Poincaré (*Act. Math.*, vii., p. 259) only reveals itself when the computations are carried so far as the *third* order of small quantities, a conclusion which is confirmed by the result of a previous investigation on the figures of equilibrium of rotating cylinders (Phil. Trans., A. 200 (1902), p. 67).—Dr. C. **Chree**: The 27-day period in magnetic phenomena. The author has dealt in two previous papers in the Philosophical Transactions with data which seemed to confirm the reality of a period of about 27 days in magnetic phenomena, in the sense that if any particular day is more than ordinarily disturbed, or more than ordinarily quiet, the day which is 27 days later shows a decided bent in the same direction. In these investigations use was made almost entirely of magnetic "character" figures. As international "character" figures do not exist for years prior to 1906, and as "character" figures assigned at one station are open to certain objections, it appeared desirable to ascertain whether or not the 27-day period is clearly shown in the average year by the amplitude of the daily ranges of the magnetic elements. This is investigated in the present paper, use being made of the Kew declination horizontal force and vertical force ranges from 1890 to 1900, treated independently. The period is found to be clearly shown by the range of each element.—J. J. **Nolan**: Electrification of water by splashing and spraying. Water is broken into fine drops—(1) by allowing it to fall into a horizontal air stream of high velocity; (2) by spraying. The size of the drops and the charge per c.c. of water are measured. The conditions of the experiments enabled measurements to be made for drops of different sizes. It is found that the charge is positive and inversely proportional to the radius of the drops. This result follows if we assume that there is a constant charge produced per unit area of new water surface formed. The value of this constant is approximately $2{\cdot}7 \times 10^{-3}$ electrostatic units for distilled water, the splashing and spraying methods giving identical results.—W. G. **Duffield**: Effect of pressure upon arc spectra. No. 5.—A. **Campbell** and D. W. **Dye**: The measurement of alternating electric currents of high frequency. As the accurate measurement of currents larger than 1 ampere at high frequencies presents considerable difficulty, the authors have investigated the accuracy obtainable in the use of air-core current transformers (suggested by Mr. T. L. Eckersley). It is found that, with proper design, such transformers allow of the measurement of currents up to 50 amperes or higher, at frequencies from 50,000 up to 2,000,000 per second, with an accuracy of 1 or 2 parts in 1,000. Over the same range of frequency it is also found that iron-cored transformers can easily be designed so as to give very accurate results.—Sir D. **Bruce**, Maj. A. E. **Hamerton**, Capt. D. P. **Watson**, and Lady **Bruce**: (1) The trypanosome causing disease in man in Nyasaland. The Liwonde strain. Part i.—Morphology. Part ii.—Susceptibility of animals. (2) The naturally infected dog strain. Part i.—Morphology. (3) Susceptibility of animals to the naturally infected dog strain. (4) Morphology of various strains of the trypanosome causing disease in man in Nyasaland. The human strain. vi.–x. (5) The trypanosome causing disease in man in Nyasaland. ii.—The wild game strain. iii.—The wild *Glossina morsitans* strain. Part ii.—Susceptibility of animals. (6) The naturally infected dog strain. Part iii.—Development in *Glossina morsitans*. (7) The naturally infected dog strain. Part iv.—Experiments on immunity.—Dr. F. **Horton**: The origin of the electron emission from glowing solids.—W. A. D. **Rudge**: Some sources of disturbance of the normal atmospheric potential gradient.—Prof. J. **Joly**: A theory of the nature of cancers and of their treatment by radio-therapy.—C. S. **Mummery**: Morphological studies of benzene derivatives. VI.—Parasulphonic derivatives of chloro-,

bromo-, iodo-, and cyano-benzene.—F. H. **Newman**: Absorption of gases in the discharge tube.—Miss M. P. **FitzGerald**: Further observations on the changes in the breathing and the blood at various high altitudes.—W. E. **Agar**: Experiments on inheritance in parthenogenesis.—C. S. **Myers**: The influence of timbre and loudness on the localisation of sounds.—S. J. **Kalandyk**: (1) The conductivity of salt vapours. (2) The ionisation produced by gas reactions. The experiments described in (1) show:—1. The conductivity of the salt vapours is due to the processes occurring in the vapours themselves. 2. The vapours of carefully dried salts conduct the electric current. Therefore the conductivity cannot be ascribed to the chemical action of water vapour in the salt vapours. However, the presence of water vapour increases the current passing in salt vapours. 3. When cadmium iodide was very carefully dried it was possible to observe a current which was practically independent of time. 4. The connection between the current i and the temperature θ may be expressed with considerable accuracy by the formula $i=ae-b/\theta$ where a and b are constants. 5. The ionising potential calculated from the energy of dissociation is considerably less than for the ordinary gases. 7. The dissociation of vapours is not always accompanied by ionisation.—H. **Richardson**: The excitation of γ-rays by β-rays.—F. E. E. **Lamplough** and J. T. **Scott**: The growth of metallic eutectics.—W. E. **Curtis**: Wave-lengths of hydrogen lines and determination of the series constant. (1) The wave-lengths in I.A. of the first six lines of the hydrogen series have been determined with an accuracy of about 0·001 A.U. (2) Balmer's formula has been found to be inexact. The results may be represented by a modified Rydberg formula containing only two constants, thus:—

$$n=\frac{N}{4}-\frac{N}{(m+\mu)^2}$$

where

$$N=109,679{\cdot}22$$

and

$$\mu=+0{\cdot}0_5 69.$$

(3) An accuracy of 0·001 A.U. is attainable in the third order of a 10-foot concave grating if the exposures are short (say less than half-an-hour). With longer exposures accurate determinations become very difficult if the temperature of the instrument cannot be controlled. (4) The tertiary iron arc standards determined by Burns were tested in the special regions under investigation, and found very satisfactory.—A. **Compton**: Constancy of the optimum temperature of an enzyme under varying concentrations of substrate and of enzyme.—Dr. E. H. **Griffiths** and Ezer **Griffiths**: The capacity for heat of metals at low temperatures. An account is given of an investigation into the capacity for heat of some metals at various points in the range 0° to −160° C. A new method of obtaining constant temperatures is described in which the Joule-Thomson cooling effect on expansion of air is utilised. The formulæ of Einstein, Nernst and Lindemann, and Debye are compared with the experimental results over a very extended range of temperature. None of the formulæ, however, can be regarded as completely representing the experimental results.—T. **Lewis**, J. **Meakins**, and P. D. **White**: The excitatory process in the dog's auricle.—Dr. P. J. **Cammidge** and H. A. H. **Howard**: (1) Observations on the composition and derivatives of urinary dextrin. (2) The so-called lævulose met with in urine. Communicated by Dr. A. E. Garrod.—T. M. **Lowry**: The silver voltameter. Part iii.—The solvent properties of silver nitrate solutions.—A. **Mallock**: Fog signals.—Areas of silence and greatest range of sound.—W. R. **Bousfield**: The osmotic data in relation to progressive hydration.—Dr. S. **Chapman**: The lunar diurnal variation of the earth's magnetism at Pavlovsk and Pola (1897–1903).—W. **Barlow**: The interpretation of the indications of atomic structure presented by crystals when interposed in the path of X-rays.—Prof. J. C. **McClennan**: The fluorescence of iodine vapour excited by ultra-violet light.—A. E. **Oxley**: The influence of molecular constitution and temperature on magnetic susceptibility. Part iii.—On the molecular field in dia-magnetic substances.—A. **Holt**: Diffusion of hydrogen through palladium.

Physical Society, June 20.—Sir J. J. Thomson, president, in the chair.—Sir J. J. **Thomson**: Production of very soft Röntgen radiation by the impact of positive and slow kathode rays. Röntgen and his pupils held that light waves are identical in nature with electrical waves produced by mechanical means, but there is a gap between the longest infra-red radiation and the shortest electrical wave that can be produced mechanically. The work already done on X-rays has demonstrated the existence of two separate rings of electrons in the atom, one within the other. These rings are responsible for the K and L types of radiation respectively. The L radiation is so much softer than the K that if a third ring of electrons exists, the radiation from which is proportionately softer than that of the L type, this radiation will fall well within the gap. In an experiment described a special form of discharge tube was employed. The positive rays passed through a tubular perforation in the kathode and impinged obliquely on a metal target. A photographic plate of the Schumann type was situated at the further end of a branch tube so that no solid obstacle interposed between the target and the plate. When the discharge passed the photographic plate was affected. An intense transverse electrostatic field between two metal plates situated between the kathode and the target completely stopped the effect, showing that this was not due to stray radiation *reflected* from the target. Hence the passage of positive particles from the kathode to the target was essential. A strong transverse electrostatic field in the branch tube had no effect, showing that a radiation was passing between the target and the plate, which was not, therefore, merely affected by positive particles rebounding down the side tube after impact on the target. The properties of this radiation were intermediate between ordinary X-rays and Schumann waves. They were susceptible to reflection by metal surfaces, and their penetrating power was small. They were stopped by the finest collodion film obtainable. The quality of the radiation did not depend on the energy of the moving particles which gave rise to it, but on the velocity. Hence equally soft rays should be produced by kathode particles if these were travelling as slowly as the positive rays. The velocity of impact was varied over a large range, and radiations were obtained varying in quality from hard X-rays to the so-called Schumann waves. It is hoped by the study of these radiations to determine not only the number of rings of electrons within the atom, but the number of electrons in each ring.—F. W. **Aston**: The homogeneity of atmospheric neon.

June 26.—Dr. A. Russell, vice-president, in the chair.—Prof. J. A. **Fleming**: Atmospheric refraction and its bearing on the transmission of electromagnetic waves round the earth's surface. The conditions under which true atmospheric refraction would be sufficient to carry a ray of light or electromagnetic radiation

sent out horizontally from any point on the earth's surface round the earth parallel to its surface are considered. Pure diffraction is insufficient to account for all the phenomena of long-distance wireless telegraphy, but some action of the atmosphere which tends to curve the radiation round the earth has to be postulated. The theory of ionic refraction, based on the theoretical conclusion that in ionised air the velocity of long electric waves is increased, has been put forward. The atmosphere decreases in density as we rise, and this alone produces a decrease of refractive index and an increase in velocity. Formulæ are deduced expressing the variation of density with heights taking into account the known temperature variation with increase of height. At a height of 100 km. the terrestrial atmosphere must consist substantially of hydrogen and helium. An expression is obtained for the radius of curvature at any point of a ray of light sent out horizontally from the earth's surface. This radius at the starting point is given by $\rho=\mu_0(98Aq_0^2)$, where μ_0 and q_0 are the refractive index and density at the surface; and A is the Gladstone and Dale constant for the gas which forms the atmosphere. For air ρ is four times the earth's radius, for hydrogen 136 times, and for krypton equal to the earth's radius. If the terrestrial atmosphere consisted wholly of krypton a ray sent out horizontally would be refracted round the earth, and wireless telegraphy to the Antipodes would be possible. For the same atmospheric density and constant A this circular refraction would result if the earth were twice its present diameter. The suggestion is made that perhaps neon and krypton are manufactured at great atmospheric heights by electric discharges occurring in the rarefied hydrogen atmosphere. Also that by their ease of ionisation they contribute to produce the ionised layer demanded by the theories of Heaviside and Eccles to account for the actual achievements of long-distance wireless telegraphy. Our earth is perhaps unique in being the only planet on which long-distance radio-telegraphy is possible. —G. **Dobson**: Atmospheric electricity observations made at Kew Observatory. Observations were made (1) using the standard Wilson instrument on a stand according to the usual practice, and (2) using an experimental apparatus level with the ground, which was assumed to give correct results. A comparison was made of the electric conductivity of the air as measured by Mr. Wilson's apparatus and that designed by Prof. Ebert.—T. **Barratt**: Thermal and electrical conductivities of some of the rarer metals and alloys. A new method of the "stationary temperature" type is employed for measuring the thermal conductivities of some of the rarer metals, including tantalum, molybdenum, rhodium, iridium, and tungsten, at air temperatures and at 100° C.—F. **Mercer**: Some investigations on the arc as a generator of hgh-frequency oscillations. Experiments on the copper-carbon arc when used as a generator of high-frequency oscillations. The first experiments deal with the effect of varying the arc length, and also the arc current, on the magnitude and frequency of the shunt current. The effect on frequency arises from a change in the resistance of the arc. The second refers to the effect on the shunt current of altering the ratio of inductance to capacity.

PARIS.

Academy of Sciences, July 6.—M. P. Appell in the chair.—Arnaud de **Gramont**: General observations on the ultimate lines of elements from various sources of light. It is pointed out that the strongest lines in the spectrum of a simple body, the "Hauptlinien" of the German physicists, are not identical, the ultimate lines persisting in the condensed spark, and the work of Hartley and Moss is criticised from this point of view. Arranged in decreasing order of temperature the sources of light used were the condensed spark with self-induction, condensed spark without self-induction, non-condensed spark, electric arc, oxy-acetylene blowpipe, oxygen-coal gas flame. Experiments were carried out on forty elements, and a general summary of the results is given.—M. de **Forcrand**: The thermochemical study of some hydrates of manganese sulphate. The values obtained for the hydrates with 2, 3, and 4 H_2O are not in accord with Thomsen's data for the same salts. There would appear to be two isomers of the anhydrous sulphate.—P. **Chofardet**: Observations of the new comet 1914c (Neujmin) made at the Observatory of Besançon. Position given for July 4. The comet appeared as a round nebulosity, about 15″ diameter, with a slight central condensation. About 12·5 magnitude.—G. **Beauvais**: The definition of time given by a clock. A study of the clock installed in the cellars of the Paris Observatory, by means of Abraham's photographic chronograph. It was found that a double second might easily be 0·008 sec. too long or too short, with occasional rare deviations amounting to 0·02 sec. The effect of this on the comparison of two pendulums by the method of coincidences and upon the definition of time is discussed. Georges J. **Remoundos**: Series of functions and the singularities of differential equations.—Th. **De Donder** and O. **De Ketelaere**: The electromagnetic field of Maxwell-Lorentz and the gravitation field of Einstein.—Gustave le **Bon**: The principle of relativity and intra-atomic energy.—Léon **Brillouin**: The calorific conductivity and viscosity of monatomic liquids.—C. de **Watteville**: A new method of studying spark spectra. It is known from the work of Hemsalech that when a spark passes between two conductors the initial spark is followed by the production of metallic vapour, and the latter remains luminous for an appreciable time. A new form of apparatus is described which permits of the separation of the luminous effects of the spark and the metallic vapour.—G. **Brañas**: The microradiograph. A description (with diagram) of a new self-recording Morse apparatus for radio-telegraphic signals. With this apparatus installed at Madrid records of messages sent from Paris, Poldhu, and Norddeich have been registered.—H. Kamerlingh **Onnes**: The persistence of electric currents without electromotive force in superconductors. From a study of the resistance of metals at low temperatures attainable with liquid helium it was concluded that the resistance of mercury would be measurable at 4·25°, but would become negligible at 2°. This conclusion has been verified experimentally, but with the unexpected result that the resistance disappears suddenly, for mercury at 4·19°. In a mercury thread at 1·7°, current can be passed with a density of 1000 amperes per sq. mm. without a measurable difference of potential (limit of accuracy $0{\cdot}03\times10^6$ volt) at the extremities, and without developing heat. (See article in NATURE, July 9, p. 481).—H. **Abraham**, A. **Dufour**, and G. **Ferrié**: A method of direct measurement of the time of propagation of the waves of wireless telegraphy on the surface of the globe. The chronographic method ultilised permits of the absolute measurement of a time interval with a precision of 0·00001 sec. The velocity of propagation found for the Hertzian waves between Paris and Washington was 296,000 km. per sec., slightly less than the velocity of light.—M. **Abonnenc**: The influence of tellurium on the sensibility of selenium to light. Carefully purified selenium was

mixed with 1, 3, 4, 5, and 7 per cent. of tellurium, and the changes of resistance caused by exposure to light measured. Pure selenium was most sensitive to white light; with red rays the cell with 1 per cent. of tellurium gave the largest change of resistance.—M. **Boulouch**: Systems of dioptres of revolution round the same axis.—L. G. **Stokvis**: The creation of third harmonics in alternators as a result of a want of equilibrium of the phases.—Ruby **Wallach**: The magnetic study of iron oxide. Three forms of precipitated ferric oxide were studied, and the magnetic susceptibility of each determined as a function of the temperature. The results are given graphically.—R. **Portevin**: The velocity of transformation of steels on heating and on the specific electrical resistance of iron.—P. **Chevenard**: The specific volumes of nickel steels.—H. **Guilleminot**: The coefficient of diffusion of the X-rays by substances of low atomic weights, especially organic substances. Some new facts in support of the conclusions given in an earlier paper.—André **Kling**, D. **Florentin**, and P. **Huchet**: Properties of Recoura's green chromium sulphate. For twenty-four hours after their preparation solutions of the green chromium sulphate contain no sulphate ions precipitable by benzidene chlorhydrate; on standing sulphate ions are gradually formed, an equilibrium, depending on the temperature and concentration, being ultimately reached.—L. **Tschugaeff** and W. **Ichlopine**: Some compounds of monovalent nickel. Nickel salts treated with a mixture of sodium hydrosulphite and nitrite give a violet compound, in which the nickel appears to be monovalent, since caustic soda gives a hydroxide NiOH, convertible by sodium sulphide into Ni_2S.—Jacques **Joannis**: The catalytic influence of copper oxide on the combination of oxygen with hydrogen. Iron wire at 300° does not act catalytically on the combination of hydrogen and oxygen, but the two gases react in presence of CuO at the same temperature. The water vapour formed exerts a considerable influence on the catalysis.—A. **Villiers**: Sulphide of manganese and the estimation of this metal. A study of the conditions necessary for the precipitation of the green form of manganese sulphide.—P. **Lebeau** and M. **Picon**: Some hydrogenations by sodammonium: hydrocarbons. With this reducing agent acenaphthene takes up four atoms of hydrogen—anthracene two, phenanthrene four, diphenyl four, and stilbene two. Amylene, benzene, toluene, and cymene, on the other hand, are unaffected.—H. **Gault**: The conversion of oxalacetic ester into α-pyrone derivatives.—R. **Cornubert**: The allyl*cyclo*hexanols, methylallyl*cyclo*hexanols, propyl- and methylpropyl-*cyclo*hexanones, and *cyclo*hexanols.—Henri **Wohlgemuth**: Syntheses by means of the mixed organometallic derivatives of zinc. The γ-chloro-ketones and corresponding products of hydrolysis.—J. **Bougault**: The dioxytriazines.—Léon **Lutaud**: The Senonian of Mazougues (Var).—E. A. **Martel**: The torrential origin of peduncular rocks.—Emile **Belot**: An attempt at the verification of the new physical theory of the formation of oceans and primitive continents.—M. **Cluzet** and Th. **Nogier**: The physical analysis of some springs of Evaux-les-Bains. The water from three springs and the gas from one were examined. Measurements are given of the temperature, density, electrical resistance and radio-activity. The César spring gives a high figure for the radium emanation, 80 millimicrocuries per litre of gas at the spring.—Henri **Lecomte**: The constitution of the seeds of Musa.—H. **Guillemard** and G. **Regnier**: Observations on the physiological action of the climate at high altitudes.—Paul **Godin**: A series of laws of growth based on 2000 observations of children, 300,000 measurements, 1891–1893–1914.—André **Mayer** and Georges **Schaeffer**: Constancy of the concentration in lipoids containing phosphorus of the whole organism; concentration in lipoids in course of growth. Application to biometrics.—Emile F. **Terroine**: Constancy of concentration of whole organisms in fatty acids and cholesterol. Evaluation of the reserves of fats.—Georges **Tanret**: Some physiological properties of the sulphate of galegine. The alkaloid leads to paralysis of the spinal column and nerve centres.—Mme. Marie **Phisalix**: Vaccination against experimental hydrophobia by the cutaneous mucous secretion of Batrachians, followed by snake poison.—E. **Bataillon**: The electrical conductivity of the eggs of virgin Batrachians.—M. **Lécaillon**: The reproduction of *Galerucella luteola*.—Ed. **Sergent** and H. **Foley**: The period of latency of the spirillum in the bug infected with recurrent fever. The virus of recurrent fever, besides the spirillum form, can assume another form, very minute, but equally virulent.—L. **Lindet**: The influence of the mineral content of caseins upon their solubility.—Pierre **Thomas** and Robert C. **Moran**: The proteid substances of *Aspergillus niger*.

NEW SOUTH WALES.

Linnean Society, May 27.—Mr. C. Hedley, vice-president, in the chair.—R. J. **Tillyard**: Some problems concerning the development of the wing-venation of Odonata. As a result of a study of the tracheation of the developing wings of a very large number of dragonfly nymphs, several problems have been elucidated. It is claimed that the Zygoptera are undoubtedly reduced descendants of broader-winged dragonflies. The primary cause of all the peculiarities in Odonate wing-venation is traced back to the change made by an originally land-dwelling larva to fresh water, and the consequent development of a flow of oxygen in the tracheal system from the anal end of the body.—E. W. **Ferguson**: Revision of the Amycterides. Part iii.—Notophes, Amycterus, and genera allied to Talaurinus. A number of the smaller genera are dealt with, partly for convenience, partly because they are mostly related to Talaurinus.

BOOKS RECEIVED.

A First Book of Chemistry. By W. A. Whitton. Pp. vii+150. (London: Macmillan and Co., Ltd.) 1*s*. 6*d*.

The Pupil's Class-Book of Geography. The British Isles. By E. J. S. Lay. Pp. 118. (London: Macmillan and Co., Ltd.) 6*d*.

Physics of the Household. By Prof. C. J. Lynde. Pp. xi+313. (London: Macmillan and Co., Ltd.) 5*s*. 6*d*. net.

The Farm Woodlot. By E. G. Cheyney and Prof. J. P. Wentling. Pp. xii+343. (London: Macmillan and Co., Ltd.) 6*s*. 6*d*. net.

The Man of Genius. By Dr. H. Türck. Pp. vi+483. (London: A. and C. Black.) 12*s*. 6*d*. net.

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