UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Dr. William Somerville has been elected to the Sibthorpian professorship of rural economy.

The following have been nominated to examine in the final honour schools:—in physics, Mr. W. C. D. Whetham; in chemistry, Prof. Arthur Smithells; in physiology, Mr. W. M. Bayliss.

An examination for a geographical scholarship of the value of 60*l*. will be held on October 11. Candidates, who must have taken honours in one of the final schools of the University, should send in their names to the reader in Geography, Old Ashmolean Building, Oxford, by October 1.

An appointment to the Oxford biological scholarship at Naples will be made next Michaelmas term. Candidates should send their names to the professor of comparative anatomy, the professor of physiology, or the professor of botany, by October 15.

CAMBRIDGE.—Dr. Nuttall, F.R.S., has been appointed reader in hygiene; Dr. L. Humphry has been re-appointed university lecturer in medicine, and assessor to the regius professor of physic.

The degree of LL.D. *honoris causa* will, on June 16, be conferred on His Excellency Paul Cambon, G.C.V.O., the French Ambassador.

A prize of 50*l*. from the Gordon-Wigan fund will be awarded in next Easter term for a research in chemistry to be carried out in Cambridge by a member of the University under the standing of Master of Arts.

A course of lectures and demonstrations in crystallography will be given during the long vacation by Mr. Hutchinson, beginning on July 7.

In the Mathematical Tripos, part i., two candidates are bracketed as senior wranglers, namely, Mr. A. T. Rajan and Mr. C. J. T. Sewell, both of Trinity. There are thirty-three wranglers. In part ii. all seven candidates are placed in the first class.

The diploma in agriculture has been awarded to six candidates, who have passed both parts of the examination.

The certificate of research has been awarded to two advanced students, Mr. P. Phillips and Mr. E. F. Burton, both of Emmanuel College, for researches in experimental physics.

Prof. Sims Woodhead will represent the University at the dedication of the new buildings of the Harvard Medical School on September 25 and 26.

The inaugural address of the local lectures summer meeting will be given by the Hon. Whitelaw Reid, American Ambassador, on August 2.

MR. HALDANE, M.P., Secretary of State for War, has consented to distribute the prizes at the London Hospital Medical College on Friday, July 13.

PROF. LECOMTE has been appointed professor of the botany of the phanerogams in the Paris Museum of Natural History, and Dr. Trouessart professor of zoology.

HERR ADOLF HALLICHS, managing director of the Friedrich Wilhelms metallurgical works, Mülheim, has been appointed a professor of the Technical High School at Aachen.

DR. R. SCHENCK, privatdocent for chemistry in the chemical institute of Marburg University, has been chosen for the professorship of physical chemistry in the Technical High School in Aachen.

DR. FRANZ ARTHUR SCHULZE, privatdocent and senior assistant in the physics institute in Danzig, has been appointed professor of physics in the Technical High School as successor to Prof. Zenneck, now in Brunswick.

MR. J. D. DALY, of the Department of Agriculture and Technical Instruction, Ireland, has been appointed secretary of the Royal Commission upon Trinity College, Dublin, and the University of Dublin.

DR. OTTO DIELS, senior assistant in the chemical institute of the University of Berlin, whose brilliant discovery of carbon suboxide was only recently made known, has been granted the title of professor. Dr. Karl Neuberg, assistant in the pathological institute of the same University, has also received the same honour.

AT the meeting of the Glasgow University Court on June 7 a letter of resignation was received from Prof. McKendrick, the professor of physiology. Prof. McKendrick has held the chair of physiology for thirty years, and has decided to retire at this time in order that his successor may have a considerable share in the equipment, and an opportunity of arranging the details of apparatus, both for teaching and research, of the physiological laboratories, which have been designed according to specifications supplied by Prof. McKendrick, and are now approaching completion.

IT is announced in *Science* that Yale University has received an anonymous gift of 1000*l*. to the forestry school, the income of which is to be used for the publication of works on forestry by graduates and members of the faculty.

THE council of the University of Paris has definitely approved of the scheme for the extension of the University. This will include, according to the *Lancet*, the construction of an institute of chemistry covering an area of 9000 square metres. Here will be established the various departments of chemistry belonging to the faculty of science and the department of applied chemistry which, since its creation, have been provisionally installed in some sheds. The cost of this will be 3,000,000 francs, which will be divided between the City of Paris and the State. The extension scheme also includes the acquisition by the University, in view of future necessities, of a plot of land of 14,000 square metres. Towards the cost of this land the University will pay 1,900,000 francs and the city 700,000 francs, to which will be added the donation from the Prince of Monaco. On a portion of this area will be erected the Institute of Oceanography, founded by the Prince of Monaco.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 15.—"On the Specific Heat of, Heat Flow from, and other Phenomena of the Working Fluid in the Cylinder of the Internal Combustion Engine." By Dugald **Clerk**. Communicated by the Hon. C. A. Parsons, C.B., F.R.S.

This paper describes experiments made with a gas-engine of sixty brake horse-power, devised to obtain data necessary for a more complete theory of the internal combustion motor, and also to discriminate between the effects of continued combustion in a gaseous explosion, and specific heat change, at temperatures between 200° C. and 1500° C. The new method of experiment consists in alternately compressing and expanding the highly heated gases within the engine cylinder while cooling proceeds, and observing by the indicator the successive pressure falls and compression and expansion curves from revolution to revolution.

From some two hundred indicator cards taken under varying conditions have been calculated:—(1) a curve of apparent specific heat of the gaseous contents at constant volume between 200° C. and 1500° C.; (2) curves of heat loss to the enclosing walls; and (3) distribution of heat in the working cycle calculated from diagrams only. The apparent specific heat at constant volume is proved to increase from 22 foot-pounds per cubic foot at 200° C. to 27·4 foot-pounds at 1500° C., and an examination of expansion curves and specific heat determinations made at different engine speeds and jacket temperatures shows that combustion is proceeding, and accounts for a part of the apparent increase of specific heat. Tables I. and II. show the apparent instantaneous specific heats and the mean specific heats in foot-pounds per cubic foot of working fluid at 0° C. and 760 mm.

TABLE I.—*Table of Apparent Specific Heats (Instantaneous) in foot-pounds per cubic foot of Working Fluid at* 0° C. *and* 760 mm.

Temperature ° C.	Specific heat at constant volume ft.-lbs.	Temperature ° C.	Specific heat at constant volume ft.-lbs.
0	19·6	800	26·2
100	20·9	900	26·6
200	22·0	1000	26·8
300	23·0	1100	27·0
400	23·9	1200	27·2
500	24·8	1300	27·3
600	25·2	1400	27·35
700	25·7	1500	27·45

TABLE II.—*Table of Mean Apparent Specific Heats in foot-pounds per cubic foot of Working Fluid at* 0° C. *and* 760 mm.

Temperature ° C.	Specific heat at constant volume ft.-lbs.	Temperature ° C.	Specific heat at constant volume ft.-lbs.
0—100	20·3	0—900	23·9
0—200	20·9	0—1000	24·1
0—300	21·4	0—1100	24·4
0—400	21·9	0—1200	24·6
0—500	22·4	0—1300	24·8
0—600	22·8	0—1400	25·0
0—700	23·2	0—1500	25·2
0—800	23·6		

The curves of heat loss show that for equal temperature differences heat loss per unit surface exposed increases with density, and values are given of the heat losses for various temperatures. From these curves mean temperatures of the cylinder walls have been calculated, and shown to vary at full load from 190° C. for the whole stroke to 400° C. for the three-tenths stroke.

Calculations are made of heat distribution in the working cycle of the fluid which show that the total heat present in the form of combustible gas can be accurately calculated from the indicator diagram alone, by means of the new data obtained in the investigation.

It is pointed out that with a sufficiently sensitive indicating instrument the rate of continued combustion can be determined, and the true change of specific heat obtained from experiments made by the new method. The determination of the specific heat of gases heated by high compressions, such as one and a half tons to the square inch, is suggested, to avoid the complications introduced by combustion. It is shown that in these experiments the rate of loss of a mass of flame at 1000° C. to the comparatively cold walls of the cylinder was less than the rate of addition of heat by work performed by the piston, so that the flame temperature in the first compression rose from 1000° C. to about 1300° C., that is, compression in 0·25 second enabled a mass of flame to be handled in such a manner as to obtain accurate results. In these experiments, with maximum pressures of four hundred pounds per square inch, nearly twenty-eight tons total pressure was applied from 120 to 160 times per minute.

Mallard and Le Chatelier's experiments are discussed, and it is shown that no curve of specific heat can be deduced from their observations. It is pointed out that the curve of apparent change of specific heat of certain gases from 0° C. to 1500° C. has been here determined experimentally for the first time. The gases forming the working fluid consist mainly of carbonic acid, steam, nitrogen, and oxygen. The composition and all other details are given in the paper.

Anthropological Institute, May 22.—Prof. W. Gowland, president, in the chair.—(1) A series of slides of stone monuments found in Assam; (2) a paper on the "genna" (tabu) among the tribes of Assam: T. C. **Hodson.** The tabus are of two kinds, general or communal, as contrasted with private or individual tabus. Communal tabus are observed by the whole village, which consists of several exogamous subdivisions, and are automatic, in the sense that they are of regular occurrence or necessarily follow the occurrence of some event. These regular tabus are mostly connected with the crops, and are frequently times of great license. The village is made genna before the crop is sown, at the harvest-home, and sometimes on the appearance of the first blade of the crop. When the village is genna everyone must stay in until the tabu is over, and it sometimes lasts as long as ten days, and no one who is outside is allowed to come in. The village is also genna when a rain-making ceremony is necessary, and, in fact, any magical ceremony for the good of the whole community is necessarily accompanied by a general genna. Gennas are also occasioned by natural phenomena, such as earthquakes, eclipses, &c., and when the annual ceremony of laying the ghosts of those who have died within the year is held. Individual gennas are necessary at all important events in life, such as childbirth or marriage, and are as inevitable as crop gennas. They are also extended to certain foods, especially in the case of the head man of the village, and are also necessary when any person wishes to erect a monolith, usually for self-glorification. Such an individual is genna from the moment he takes the first steps towards erecting a monolith until the stone is finally in position. Slides of these monuments were shown by Mr. Hodson earlier in the evening. Gennas are also occasioned by the birth or death of any animal within the house, and warriors before and after a raid are subject to them.

Geological Society, May 23.—Mr. R. S. Herries, vice-president, in the chair.—The importance of Halimeda as a reef-forming organism, with a description of the Halimeda-Limestones of the New Hebrides: F. **Chapman** and D. **Mawson.** Calcareous algæ, nullipores, Lithothamnion, &c., have been frequently referred to as forming important contributions to the rock of coral-reefs. The material obtained in the great boring, the lagoon borings, and lagoon dredging at Funafuti has yielded a considerable quantity of Halimeda, and Dr. Guppy has described a Halimeda-Limestone in the Solomon Islands. Evidence such as this shows that the important deposits of calcareous plant-remains forming at the present day can scarcely be paralleled by any deposit formed in past geological times except, possibly, the limestones of the Alpine Trias, which owe their origin to the thallophytes Diplopora and Gyroporella. Among other Halimeda-Limestones mentioned by the authors are those of Christmas Island, Fiji and Tonga, and the New Hebrides.—Notes on the genera Omospira, Lophospira, and Turritoma, with descriptions of new species: Miss Jane **Donald.** The new species described in the paper belong to three genera, characterised by the possession of a band on all the whorls formed by the gradual filling up during growth of a sinus, and not a slit, in the outer lip.—Lantern-slide views illustrating the late eruption of Vesuvius and its effects: Prof. H. J. **Johnston-Lavis.** Nearly all the photographs were taken by the exhibitor, who explained the different phenomena portrayed. He considered this eruption to resemble mostly that of 1822, although the present crater was larger, attaining 1500 feet both north-by-south and east-by-west; it was probably 500 feet to 600 feet deep at least. The remarkable character about this eruption was the large amount of fragmentary material ejected, especially in a north-easterly direction, crushing in the roofs of the buildings in the towns of Ottajano, San Giuseppe, and Terzigno. At the first-named locality the depth attained was nearly 0·75 metre, made up as follows:—0·04 m. grey dust, 0·49 m. reddish lapilli, chiefly "supplementary ejecta," 0·20 m. black vesicular scoria, chiefly the "essential ejecta." The material which fell at the observatory and Naples had much the same arrangement, but was, of course, less, and practically only sand and dust. Near the base of the cone the ejecta attain to blocks several tons in weight; and it may be estimated that, at the north-eastern toe of the great cone, in some places, the débris must be 60 feet thick. It is to be seen as much as 30 feet in thickness in the new ravines that have been formed. After careful study, Prof. Johnston-Lavis had come to the conclusion that the remarkably uniform and deep scoring of the cone by very regular "barrancos" was due to the sliding and avalanche-like effect of the rapidly accumulating fragmentary material on the steep slopes, and not due to water-action. The volcano seems to have opened at four, if not five, different places on the south-western, southern, and south-

eastern sides, giving rise to at least three important streams of lava. Another rift, to the north-north-east of the cone, emitted lava that forms an apron on that side of the mountain, and must, of course, have been formed early in the eruption, that is, before April 7 to 8. The ejected blocks are chiefly old lavas and scoria, partly re-cooked and metamorphosed, with their cavities filled by tachylytic juice from the fluid magma of the neighbouring chimney. The cavities are also often lined by sublimations of augite, hornblende, leucite, microsommite, hæmatite, halite, and a well-crystallised, yellow, deliquescent mineral which proves to be a new chloride of manganese and potash for which a new mineral name is proposed. A few fragments of limestone, and the various mineral aggregates derived by metamorphism from it, are met with, but they are chiefly re-ejected old ejected blocks. A light green spongy tachylyte is also frequent. The "essential ejecta," either as scoria or lava, does not show any marked difference from the usual products of Vesuvius in such eruptions during the last three centuries. Although much damage has been done, great areas of rugged lava-surfaces that would have required centuries to render cultivable are now available for the growth of woods, vines, and herbaceous plants.

Physical Society, May 25.—Dr. C. Chree, F.R.S., vice-president, in the chair.—Colour phenomena in photometry: J. S. **Dow.** The author has found that to compare lights of different colours is chiefly a matter of practice. The central portion of the retina is more sensitive to red, and less sensitive to green, than the surrounding portion. When an attempt to photometer lights of different colour is made, differences are found as the distance of the eye from the photometer-screen is altered, and different results are obtained with different photometers. Differences of 5 per cent. can easily be obtained. The Purkinje phenomenon, generally regarded as a cause of uncertainty in ordinary work, only becomes noticeable at small illuminations and with large fields of view. Experiments are described to show that flicker photometers seem to be affected by colour-phenomena, but to a smaller extent than ordinary ones. Whether flicker or an ordinary photometer is adopted, it is necessary to specify the size of the field, the distance of the eye, and the order of illumination used in order to get consistent results.—Automatic arc-lamp: H. **Tomlinson** and G. T. **Johnston.** A simple form of automatic arc-lamp. A vertical brass tube supported by a wooden framework carries the upper carbon, which can be raised or lowered by hand and clamped in any position in the tube. The lower carbon fits into a hollow brass tube, and into the lower part of the tube is fitted an iron plunger. The plunger is surrounded by a solenoid, consisting of a layer of No. 14 copper wire, the internal diameter of the solenoid being slightly greater than the diameter of the plunger. The plunger dips into a box of mercury, and is made to float upright by means of a brass collar and by the rounded ends of three nails forming an equilateral triangle. The current enters the upper carbon through the brass cylinder, passes through the lower carbon into the mercury, and then through the solenoid. To "strike the arc" the lower carbon is raised to touch the upper one, and the plunger is then permitted to sink into the mercury until the suction of the solenoid balances the buoyancy of the mercury.—The theory of moving coil and other kinds of ballistic galvanometers: Prof. H. A. **Wilson.** The exact formulæ giving the quantity of electricity passed through various types of ballistic galvanometers in common use are obtained. The various types require different formulæ, all of which reduce to the same formula when the angle of deflection is small. In the case of a moving-coil galvanometer with rectangular coil, iron core, and pole-pieces arranged so as to give a radial magnetic field, the formulæ take a simple form.—Bifilar galvanometer free from zero creep: A. **Campbell.** For measuring direct currents and voltages of ordinary range moving-coil galvanometers are convenient. The usual instruments are affected by gradual displacement of zero when a deflection is maintained for some time. This difficulty is got over by replacing the torsional suspension by a bifilar system with two wires so far apart that the gravity control swamps that due to the torsion of the wires. The wires are more than 1 cm. apart, and the sensitivity with 40 ohms resistance is 400 mm. at 1 metre for 0·001 ampere. The full deflection may be maintained for hours without causing a zero creep of 1 part in 2000. To attain good damping a powerful magnet is used.

Zoological Society, May 29.—Mr. Frederick Gillett, vice-president, in the chair.—Mammals collected by Mr. C. H. B. Grant in the Zoutpansberg district of the Transvaal, and presented to the National Museum by Mr. C. D. Rudd: H. **Schwann** and O. **Thomas.** The collection was obtained at two localities—Klein Letaba at 1000′ altitude and Woodbush at 4500′—and so gave a good general idea of the fauna of the region. In all it consisted of about 250 specimens belonging to fifty-one species and subspecies, of which several were described as new. In addition, the old genus Macroscelides was broken up into three, the new name Elephantulus being given to the group of which *M. rupestris* was the type, and Nasilio to that typified by *M. brachyrhynchus*.—The vascular system of Heloderma, with notes on that of the monitors and crocodiles: F. E. **Beddard.**—The external characters of an unborn fœtus of a giraffe (*Giraffa camelopardalis antiquorum* ♂ × *G. c. wardi* ♀): F. E. **Beddard.**—The South African diaptosaurian reptile Howesia: Dr. R. **Broom.**

DUBLIN.

Royal Irish Academy, May 14.—Dr. F. A. Tarleton, president, in the chair.—Some applications of Bessel's functions to physics: Prof. F. **Purser.** In this paper the author applies (1) the Besselian forms $K_0(nr)$ sin, cos $n2$ and $J_0(mr)$ (sin h, cos h $m2$), where $K_0(nr)=J_0(<nr)$, to the solution of problems of electric potential, viz. the finite Leyden jar and equal circular disks fronting one another at different potential, the theory of the condenser formed by a circular disk midway between two large circular plates, and of the guard-ring electrometer. (2) The same functions are applied to some problems in fluid motion. (3) Certain problems in the theory of the elastic equilibrium of a right circular cylinder are discussed by the use of the Besselian forms

$$J_1\left(mr\right)\left(\frac{x}{r},\frac{y}{r}\right)\left(\sin h,\cos h,\, m2\right),$$

$$K_1\left(nr\right)\left(\frac{x}{r},\frac{y}{r}\right)\left(\sin,\cos nr\right)$$

where

$$J_1(x)=-\frac{d}{dx}J_0(x),\ K_1(x)=\frac{d}{dx}(K_0(x)$$

(4) Lastly, the functions $J_0(mr)$, $J_1(mr)$ are applied to some problems of vortical motion of fluids under the influence of viscosity.—A map showing the relative distribution of various types of rock on the sea-floor off the west of Ireland, based on materials dredged by the Fishery Survey of the Department of Agriculture for Ireland: Prof. **Cole.** It is proposed to publish further details in the report of that survey, but meanwhile it is believed that the stones show the actual local distribution of rocks on sunken land, and are not the result of casual drift. The Porcupine Bank undoubtedly consists of a mass of olivine-gabbro, while a Carboniferous area west of co. Galway indicates that Connemara may have risen as an island in the Carboniferous sea.

Royal Dublin Society, May 15.—Prof. J. A. McClelland in the chair.—Injurious insects and other animals observed in Ireland during 1905: Prof. G. H. **Carpenter.** In addition to records of several well-known farm and orchard insects, the paper contains an account of the rare "cauliflower" disease of the strawberry, due to the small nematode worm *Aphelenchus fragariae*, J. R. Bos, observed in county Wicklow.—A possible connection between the recent disturbances at Vesuvius and San Francisco: Rev. H. V. **Gill.** This paper contained an account of some experiments with rotating bodies, and an application of the principles involved to certain seismic phenomena. A hollow tee-totum weighted at one point will not spin about its axis of symmetry, but if it contain matter capable of shifting its position, it will automatically tend to steady itself, owing to the symmetrical distribution of the movable matter round its circumference. For example, if three

steel balls of equal size be dropped into a smooth, hollow tee-totum they will take up equidistant positions round the edge. These results suggest the possibility of seismic disturbances being related in some such way. The above principles were applied to the disturbances which characterised the month of April—Vesuvius, April 8; Formosa, April 14; San Francisco, April 18. The possibility of this explanation being correct is supported by observed facts in connection with displacement of the poles associated with great earthquakes, and also by the positions of the localities referred to.

PARIS.

Academy of Sciences, May 28.—M. H. Poincaré in the chair.—Remarks on work recently carried out at the Observatory of Besançon: M. **Lœwy.**—Centres of gravity of spiraloid systems: Haton **de la Goupillière.**—An expedition in an aërostat, projected for the exploration of the North Pole: J. **Janssen.** An account of an expedition projected by Mr. Walter Wellman, and supported by the Geographical Society of Washington.—Addition to the note on the use of low temperatures in chemical analyses: MM. **d'Arsonval** and **Bordas.** In the majority of cases the vacuum obtainable by an ordinary pump is sufficient. In certain cases, however, the authors have found it advantageous to use either a mercury pump, or charcoal and liquid air, according to Dewar's method.—Magnetic observations at Tananarivo: Éd. Él. **Colin.** Three tables are given showing the results of the absolute measurements of the declination, inclination, and the horizontal component at the Observatory of Tananarivo, taken weekly from May, 1905, to April, 1906.—M. Charles Trépied was elected a correspondant in the section of astronomy in the place of M. Perrotin.—The properties which correspond to monogeneity for functions of a hypercomplex variable: Léon **Autonne.**—A particular class of Θ-functions: Henry **Bourget.**—The resistance of electrolytes for high-frequency currents: André **Broca** and S. **Turchini.** The authors showed a year ago that the theory of Lord Kelvin relating to the resistance of cylindrical conductors for currents of high frequency leads, in the case of metals, to results presenting systematic differences from those obtained experimentally. In the experiments in the present paper the conductor is an electrolyte. The resistance was first measured for a low-frequency current (42), and this assumed to be the same as with a continuous current. The resistance of the same solution was then measured with high-frequency currents (190,000 to 3,000,000). For very dilute acid or sulphate of copper solution the ratio of the two resistances thus measured was unity, but for solutions of higher conductivity the heating is less with a high-frequency current than with a low-frequency current, contrary to the result predicted by theory.—X-ray tubes with an automatic regulator: G. **Berlemont.**—The variations in the state of amorphous carbon under the influence of temperature and under the action of oscillations of temperature: O. **Manville.** Amorphous carbon, heated in a current of oxygen, commences at a definite temperature to give carbon dioxide, and at another, higher, temperature, carbon monoxide. These temperatures are a function of the temperature to which the carbon has been previously heated.—The acid phosphites of primary cyclic amines: P. **Lemoult.** The acid phosphites of aniline, *o*-toluidine, and *m*-xylidine are described, together with an advantageous method for preparing them.—The absolute atomic weight of terbium: G. D. **Hinrichs.** If the atomic weights of oxygen, sulphur, and hydrogen used in the determination of the atomic weight of thorium from the analytical figures be taken as the round numbers 16, 32, 1, then the atomic weight of thorium becomes also the round number 159, instead of the 159·22 deduced by M. Urbain.—A contribution to the study of pure ferrotungstens: Em. **Vigouroux.** Using the aluminothermal method, tungsten steels can be obtained containing 46·25 per cent. of tungsten; these, when extracted with dilute hydrochloric acid, yield the whole of the free iron, leaving a substance containing 68·7 per cent. of tungsten, a figure corresponding to Fe_2W_3.—Combinations of mercuric iodide and free methylamine: Maurice **François.**—Some hydro-anthracene derivatives: Marcel **Godchot.** A description of the mode of preparation and properties of octahydro-anthranol and its phenylurethane, β-anthracene hexahydride, γ-anthracene tetrahydride and its dibromo-derivative.—The rapidity of absorption of odours by milk: F. **Bordas** and M. **Touplain.** In an atmosphere containing only 1/100,000 of formaldehyde a few minutes' exposure is sufficient for the milk to show clearly the reaction of the aldehyde. The fresher the milk the more rapidly the absorption appears to take place.—A qualitative reaction of phosphorus: M. **Mauricheau-Beaupré.** The reaction is based on the depolishing of glass by the action of a flame containing small amounts of phosphorous compounds.—A new method for the microscopical analysis of flour and the determination of rice starch in wheat flour: G. **Gastine.** The flour is treated with certain colouring materials in solution, the whole slowly dried on the slide, and mounted in Canada balsam. The differential staining of the hilum is the basis of the method.—Oxydising catalysers and the generalisation of flameless combustion: C. **Matignon** and R. **Trannoy.**—Autocatalysis and the decomposition of a photochemical system: Béla **Szilard.** Details are given of the action of light on a solution of triiodomethane in chloroform.—The study of heterogeneous equilibria under varying pressures: E. **Briner.** The increased pressures are obtained by the use of a cylinder of compressed carbon dioxide, whilst the constancy of temperature during the reaction is ensured by a vapour jacket. A diagram of the apparatus used is given.—The nearly total transformation of the dextrins arising from the saccharification of starch into maltose: A. **Fernbach** and J. **Wolff.** The rate of production of maltose from the dextrins is much slower than the conversion of the starch into the dextrins, so that it is incorrect to assume that the reaction is finished when the liquid no longer gives the iodide of starch reaction. It is proved experimentally that if there exists a dextrin not transformable into maltose, it can represent only a minute fraction of the original starch.—The principles of gutta-percha obtained from *Palaquium Treubi*: E. **Jungfleisch** and H. **Leroux.** From the crude gutta from the leaves of this plant a new substance has been isolated, to which the provisional name of paltreubin is given. It appears to be a mixture of two isomeric alcohols of the formula $C_{30}H_{49}.OH$, the acetates of which were prepared.—The spores of a Streptothrix: MM. **Brocq-Rousseu** and **Piettre.** Under certain conditions of cultivation the spores could be obtained in such abundance that they could be analysed. The analyses given are stated to be the first published on the spores of the lower fungi.—An invasion of algæ (*Colpomenia sinuosa*) on the oysters of the Vannes River: M. **Fabre-Domergue.**—The evolution of some crustacean gregarians: L. **Léger** and O. **Duboscq.**—Researches on the relations between emotional states and infection: M. **Vaschide.** It is known that the leucocytes play an important part in the pathological processes of infection, the state of infection being especially connected with an increase in the proportion of leucocytes with polymorphic nuclei. The author has found that certain profound emotions are followed by an increase in the polynuclear leucocytes. The author cites well-known facts in pathology in support of his results.—Experimental infection by *Trypanosoma brucei*. The destruction of the parasite in the spleen: A. **Rodet** and G. **Vallet.** Experiments on dogs and rats show that in infection by this trypanosome the spleen and the other lymphoid organs are foci for intense destruction of the parasites. The spleen is endowed with an energetic trypanolytic power, and this organ evidently plays an important part in the defence of the body against infection.—The pathogenic importance of bronchial adenopathy: Gabriel **Arthaud.**—The frequency and the probable etiological *rôle* of *Uncinaria americana* in beri-beri: F. **Noc.**—The contradiction of glacial erosion: Jean **Brunhes.**—The degree of mineralisation of subterranean waters: F. **Dienert.**

NEW SOUTH WALES.

Linnean Society, April 25.—Mr. C. Hedley in the chair.—The geology of the volcanic area of the East Moreton and Wide Bay districts, Queensland: H. I. **Jensen.** The district investigated lies between the Pacific Ocean and Moreton Bay on the east, and the beds of the Mary and Stanley Rivers on the west; and between Cooran on the north and North Pine on the south. It is important

from a geological point of view on account of the variety of igneous rocks to be found within its borders. The author shows that the low-lying district east of the Blackall and D'Aguilar Ranges, which is composed essentially of Trias-Jura sandstones belonging to the Ipswich Coal-measures and Tertiary alluvials, has been subject to oscillatory movements of elevation and depression in late Tertiary times. At present elevation is going on, as evidenced by raised beaches at Point Arkwright and elsewhere along the coast. The D'Aguilar Range north of Woodford is made up of Trias-Jura sandstone, but to the south of this point it consists of highly interesting plutonic and metamorphic rocks belonging in part to the Gympie beds, in part to much older formations. The country to the west of the D'Aguilar Range forms a peneplain with an average elevation of 500 feet. The Blackall Range is shown to consist of basalt capping rhyolites and rhyolitic tuffs, and Trias-Jura sandstones. The Maroochy district was a centre of great volcanic activity, rhyolites, andesites, dacites and basalts, as well as extensive areas of tuff and breccia, being here found.—The botany of Howell (Bora Creek), N.S.W.: a tin-granite flora: J. H. **Maiden.** Howell is situated nineteen miles to the south-east of Inverell. The tin-granite area under consideration extends in a two- or three-mile radius from the township. It lies on the western New England slope, at an elevation of about 2500 feet, and is included in E.9, New England County, of the botanical map to be found in the society's Proceedings for 1901 (p. 766). A list of the plants found so far, about 150 species referable to forty-two natural orders, is given. The locality is especially rich in Acacias, *A. neriifolia* perhaps being most abundant.

DIARY OF SOCIETIES.

THURSDAY, JUNE 14.

ROYAL SOCIETY, at 4.30.—The Experimental Analysis of the Growth of Cancer: Dr. E. F. Bashford, J. A. Murray, and W. H. Bowen.—On the Electrical and Photographic Phenomena manifested by certain Substances that are commonly supposed to be Ætiologically Associated with Carcinoma: Dr. W. S. Lazarus-Barlow.—The Bone Marrow; a Cytological Study forming an Introduction to the Normal and Pathological Histology of the Tissue: Dr. W. E. Carnegie Dickson.—On the Relation of the Liver Cells to the Blood Vessels and Lymphatics: Dr. P. T. Herring and Dr. S. Simpson.—Studies on Enzyme Action, Lipase, II.: Prof. H. E. Armstrong, F.R.S., and Dr. E. Ormerod.—Studies of the Processes operative in Solutions, I., The Sucroclastic Action of Acids as Influenced by Salts and Non-electrolytes: R. J. Caldwell.—The Origin of Osmotic Effects: Prof. H. E. Armstrong, F.R.S.

MATHEMATICAL SOCIETY, at 5.30.—Exhibition of Models of Space-filling Solids: W. Bailey.—The Algebra of Apolar Linear Complexes: Dr. H. F. Baker.—Supplementary Note on the Representation of Certain Asymptotic Series as Convergent Continued Fractions: Prof. L. J. Rogers.—On Certain Special Types of Convertible Matrices: J. Brill.

INSTITUTION OF MINING ENGINEERS, at 11 a.m.—Address by the President.—The Commercial Possibilities of Electric Winding for Main Shafts and Auxiliary Work: W. C. Mountain.—Electrically-driven Air-compressors, combined with the working of the Ingersoll-Sergeant Heading-machines, and the subsequent working of the Busty Seam: A. Thompson.—Practical Problems of Machine-mining: Sam Mavor.—The Strength of Brazed Joints in Steel Wires: Prof. Henry Louis.—Bye-product Coke and the Huessener Bye-product Coke Ovens: J. A. Roelofsen.—Considerations on Deep Mining: George Farmer.

SOCIETY OF PUBLIC ANALYSTS, at 8.—An Examination of the Method of Milk Analysis used at the Government Laboratory in connection with Samples referred under the Sale of Food and Drugs Acts: H. D. Richmond and E. H. Miller.—On the Examination of Linseed, Olive and other Oils: R. T. Thomson and H. Dunlop.—On the Composition and Valuation of Oils used for Gas-making Purposes: R. Ross and J. P. Leather.—Note on Fractional Distillation by Steam Vapour: H. Hardy and B. Richens.—A New Method for the Estimation of Tartaric Acid: A. C. Chapman and P. Whitteridge.

FRIDAY, JUNE 15.

INSTITUTION OF MINING ENGINEERS, at 10.30 a.m.—Rescue Apparatus and the Experience made therewith at the Courrières Collieries by the German Rescue Party: G. A. Meyer.—A New Apparatus for Rescue-work in Mines: W. E. Garforth.—A Rateau Exhaust-steam-driven Three-phase Haulage Plant: William Maurice.—Development of Placer Gold-mining in the Klondike District, Canada: J. B. Tyrrell.—Mining Education: Prof. J. W. Gregory.—The Capacity-current and its Effect on Leakage Indications on Three-phase Electrical Power-service: Sydney F. Walker.—Petroleum Occurrences in the Orange River Colony: A. R. Sawyer.

NATIONAL ASSOCIATION FOR THE PROMOTION OF TECHNICAL AND SECONDARY EDUCATION, at 3.—Annual General Meeting.

MONDAY, JUNE 18.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—A Fifth Journey in Persia: Major P. Molesworth Sykes, C.M.G.

TUESDAY, JUNE 19.

ZOOLOGICAL SOCIETY, at 8.30.—The Nudibranchs of South India and Ceylon: Sir Charles Eliot, K.C.M.G.—Description of a New Species of Zebra: The Hon. Walter Rothschild.—On the Entomostracan Fauna of the New Zealand Lakes: Dr. G. Stewardson Brady, F.R.S.—Note on some Crustacea from the Freshwater Lakes of New Zealand: Dr. Charles Chilton.—A Classification of the Selachian Fishes: C. Tate Regan.

ROYAL STATISTICAL SOCIETY, at 5.—The Generalised Law of Error, or Law of Great Numbers: Prof. F. Y. Edgeworth.

WEDNESDAY, JUNE 20.

ROYAL MICROSCOPICAL SOCIETY, at 8.—On the Structure of some Carboniferous Ferns: Dr. D. H. Scott, F.R.S.

ROYAL METEOROLOGICAL SOCIETY, at 4.30.—The Development and Progress of the Thunder Squall of February 8, 1906: R. G. K. Lempfert.—The Mean Prevalence of Thunderstorms in Various Parts of the British Islands during twenty-five Years, 1881–1905: F. J. Brodie.—Note on a Typical Squall at Oxshott, May 25, 1906: W. H. Dines, F.R.S.

THURSDAY, JUNE 21.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: The Transition from the Liquid to the Solid State and the Foam-structure of Matter: Prof. G. Quincke, For.Mem.R.S.—Experimental Evidence of Ionic Migration in the Natural Diffusion of Acids and Salts: R. G. Durrant.—Ionic Velocities in Gases at Different Temperatures: P. Phillips.—The Action of Radium and Certain Other Salts on Gelatin: W. A. Douglas Rudge.—On the Electric Inductive Capacities of Dry Paper and of Solid Cellulose: A. Campbell.

CHEMICAL SOCIETY, at 8.30.—The Cleve Memorial Lecture: Prof. T. E. Thorpe.—The Constituents of the Essential Oil from the Fruit of *Pittosporum undulatum*: F. B. Power and F. Tutin.—Mobility of Substituents in Derivatives of β-Naphthol: J. T. Hewitt and H. V. Mitchell.

LINNEAN SOCIETY, at 8.—On the Botany of Southern Rhodesia: Miss L. S. Gibbs.—On the Authentic Portraits of Linnæus (lantern slides): W. Carruthers, F.R.S.—Plantæ novæ Daweanæ in Uganda lectæ: Dr. Otto Stapf.—On the Genitalia of Diptera: W. Wesché.

FRIDAY, JUNE 22.

PHYSICAL SOCIETY, at 5.—The Effect of Radium in Facilitating the Visible Electric Discharge *in vacuo*: A. A. Campbell Swinton.—A Comparison between the Peltier Effect and other Reversible Heat Effects: A. O. Allen.—The Effect of the Electric Spark on the Activity of Metals: T. A. Vaughton.—Dielectric Strength of Thin Liquid Films: Dr. P. E. Shaw.—The Effect of Electrical Oscillations on Iron in a Magnetic Field: Dr. W. H. Eccles.

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