Society, viz. before the Chicago Section (April 24, 1897): Quaternions as members of four-dimensional space, by Prof. A. S. Hathaway. Note on the invariants of n points, by Dr. E. O. Lovett, is another communication which was made at the same meeting.—Dr. Lovett contributes also a note on the fundamental theorems of Lie's theory of Continuous Groups (October 30). The object of the note is to call attention to a misapprehension, if not an error, in a paper, by J. E. Campbell, on a law of combination of operators bearing on the theory of continuous transformation groups, read at the March 11 meeting of the London Mathematical Society (*Proc.*, vol. xxviii. pp. 381-390). The fourth paper is one read at the Toronto meeting, August 16. It is an interesting short note by Prof. T. F. Holgate, and is entitled, "A geometrical locus connected with a system of coaxial circles." The writer's object is to find the locus of points through which three lines can be drawn tangential to three circles of a coaxial system in pairs.—Condition that the line common to $n-1$ planes in an n space may pierce a given quadric surface in the same space, by Dr. V. Snyder, was read at the Detroit meeting mentioned above. The note is a generalisation of a proof recently given by the author (criteria for nodes in Dupin's cyclides) of the geometric significance of a certain determinant.—Dr. E. W. Brown gives a valuable analysis of Prof. H. Lamb's Hydrodynamics. Of this the reviewer writes: "The author is to be congratulated on the completion of a task which will earn him the gratitude of all those who are now, or may in the future be, interested in Hydrodynamics.—In the Notes are particulars of the British Association meeting at Toronto, in so far as it concerned mathematicians.—Other matters are a list of the mathematical courses for the winter semester (1897-98) in the Universities of Göttingen, Leipzig, Munich, Vienna and Strassburg.

IN the *Meteorologische Zeitschrift* for November, Dr. J. Hann gives the daily range of the meteorological elements at Cairo, deduced from the observations of the five years 1891-5, as published in the *Résumé Mensuel* of the observatory at Abbassieh. These values are of some interest, as Dr. Hann states that the monthly means contained in the tables give for the first time the true daily means for Cairo. The barometric range exhibits the small amplitudes for the latitude that have been noticed in other parts of the Mediterranean. The night minimum does not appear to fall below the daily mean throughout the year. The range of temperature shows no special peculiarities; it is greatest in June, and is greater in the dry spring than in the damp autumn. The daily range of wind force is noteworthy, especially during spring and autumn; during the year there is only a very slight variation at night-time, but in the afternoon there is a great increase in the force from winter to spring, and from summer to autumn. During the winter half-year the nights are clear, while cloud prevails at the middle part of the day; in the summer the morning hours are cloudiest, but from about noon the sky is almost cloudless. The influence of the overflow of the Nile in the autumn naturally affects the range of humidity.

IN the *Journal of Botany* for November and December, Mr. F. Townsend completes his monograph of the British forms of *Euphrasia*, of which he makes fourteen "species" founded on von Wettstein's monograph of the genus. It is accompanied by seven plates illustrating the habit of each "species," and details of the form of the flowers and leaves.—In a paper on "New and Critical Marine Algæ," Mr. E. A. L. Batters describes a number of species new to science, together with a new genus, of Florideæ, *Porphyrodiscus*, from Berwick, with the crustaceous habit of *Hildenbrandtia*.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 25.—"On certain Media for the Cultivation of the Bacillus of Tubercle."[1] By Dr. Arthur Ransome, F.R.S.

The following conclusions had been drawn from previous experiments:—

(1) That finely divided tuberculous matter, such as pure cultures of the bacillus, or tuberculous matter derived from sputum, in daylight and in free currents of air is rapidly deprived of virulence;

(2) That even in the dark, although the action is retarded, fresh air has still some disinfecting influence; and

(3) That in the absence of air, or in confined air, the bacillus retains its power for long periods of time.

These observations afforded an explanation of the immunity of certain places, and the danger of infection in others. They show that where tuberculous sputum is exposed to sufficient light and air, to deprive it of virulence before it can be dried up and powdered into dust, no danger of infection need be dreaded. It would appear further, from this research and others, that it is only when there is sufficient organic material in the air, derived from impure ground air, or from the reek of human bodies, that the tubercle bacillus can retain its existence and its virulent power.

But, in addition to the above-mentioned researches, it seemed desirable that an attempt should be made to ascertain what part was played respectively by the several forms of organic impurity that are present in insanitary dwellings. It was determined, therefore, to collect the aqueous vapours arising from the ground, or from human bodies, and to submit these products to the test of trying whether they would serve as cultivating media for the bacillus of tubercle.

By means of a simple freezing mixture of ice and salt it was easy to condense the aqueous vapour, both of the breath and that coming from ground air.

Some evidence was obtained with simple glycerine agar that the organic fluids facilitated cultivation to some extent. With the organic fluids there were only two failures, and growth was fairly rapid.

In the next series of trials, it was decided to use as the material bases some non-nitrogenous substance, and at length it was determined to use a particularly pure "filter-paper."

Some degree of success was attained in twelve out of fifteen specimens of the organic fluids.

The degree of growth was also much the same as in the previous series, though perhaps slightly less vigorous.

It was now determined to try to do without the help of the glycerine, which, as is well known, so greatly assists the ordinary cultivations of the bacillus. Accordingly, four tubes with simple filter-paper as the supporting medium, and condensed fluids, from the breath of a healthy person, and from that of a phthisical patient, as nutrient fluids, were inoculated, and no glycerine was added. In these tubes the same cultivation was used as in the previous experiments.

Shortly afterwards, two similar tubes with fluid from healthy breath alone, but with 5 per cent. of glycerine, were sown with the same cultivation, and were left at the ordinary temperature of the laboratory, about 21° C.

All of the former group took on active growth within four weeks, and one of the latter. In other words, it was proved that pure filter-paper, moistened with these condensed fluids, alone would suffice to nourish and promote the growth of the bacillus, and, further, that this growth would take place at ordinary temperatures. It may hence be concluded that when this organic fluid is present in ordinary dwellings, the bacillus may grow at the temperature of living rooms as well as at the temperature of 35° C.

Two sets of tubes were then prepared of condensed vapour from breath, and from ground air from a pure sandy soil. No glycerine was added; but for the solid medium, in some instances, the pure filter-paper was employed; in others, an ordinary lining paper, containing a little size, but carefully sterilised, was used.

Some of these were placed in the incubator at a temperature of 37° C., others were left in the dark at the ordinary temperature of the laboratory.

In many of the tubes a free growth was observed as early as the end of the first fortnight.

Out of the total number in this series of 37, in thirty six instances there was free growth on the medium employed, on both kinds of paper, and all kinds of condensed fluid. Eleven of them were grown at a temperature of about 20° C. In only one instance was there complete failure (vapour from healthy breath).

The bearing of these researches upon the subject of the prophylaxis against tuberculosis seems to be of some importance.

They prove that any one of the various organically charged vapours, whether coming from healthy or from diseased lungs,

[1] By permission of the Royal College of Physicians, this research, which forms a portion of the Weber-Parkes prize essay, is communicated to the Royal Society before publication. The cost of the inquiry is defrayed by the Thrustan prize, presented to the author this year by Gonville and Caius College, Cambridge.

from the air of cellars, or from comparatively pure ground, forms an excellent cultivating medium for the bacillus of tubercle when kept away from the disinfecting influence of air and light.

This power of promoting its growth is particularly manifest when the supporting substance is common wall-paper, though it is quite apparent when very pure filter-paper is used.

It is further proved that, on these substances, the growth of the bacillus may take place at the ordinary temperatures of dwelling-rooms; and, hence, that there is no safety against the increase of the organism in ordinary living-rooms in which active tuberculous dust is present, and in which the natural disinfectants of the bacillus, fresh air and light, are not present in sufficient amount to destroy their virulence.

Physical Society, December 10.—Mr. Shelford Bidwell, President, in the chair.—Mr. Albert Campbell exhibited: (1) An experiment to illustrate alternate exchange of kinetic energy. Two brass spheres, each about one inch diameter, are suspended from the same point by equal wires. One of them is then thrown so as to describe a circular orbit. The second sphere, starting from rest, gradually takes up motion from the first sphere, and in turn describes a circular orbit. The first now comes to rest, and the reverse process takes place. This alternating action repeats itself until all the energy is lost in the wires. (2) An experiment to illustrate the low heat-conductivity of glass, and the expansion of glass by heat. A long tube is clamped at the lower end, in a vertical position. One side of it is then heated with the flame of a Bunsen burner, and the glass is observed to bend, moving over a fixed mark near the top of the tube. When the flame is withdrawn, the first position is quickly regained. Mr. Campbell then read a paper on "Temperature compensators for standard cells." Some account of the methods adopted by the author has already been published, he now describes the apparatus. The first compensating arrangement (3) can be used for keeping the potential-difference between two points of a conducting system constant at all room-temperatures. Or it can be adapted to modify the voltage of a standard cell to some convenient whole number. This arrangement (3) resembles a Wheatstone's bridge with the galvanometer-branch removed. One pair of opposite arms is of copper, the other pair is of manganin. The bridge-battery is a Leclanché cell; this supplies the auxiliary voltage, which is utilised at the two galvanometer-points of the bridge, and is there applied in series with the standard cell. In an alternative method, suggested by Mr. C. Crawley, only one of the four arms is made of copper. The second compensating arrangement (4) is intended to maintain constant potential between two points, at all room-temperatures. For this purpose, two wires, *a* and *b*, are connected in parallel. One of them, *a*, is all of manganin, the other, *b*, is partly copper and partly manganin. Constant *current* is applied at the ends of *a* and *b*. The various resistances are chosen so as to give constant difference of potential between the ends of the manganin portion of *b*. By this method the potential-difference can be maintained to within 1 in 2000. Mr. Swinburne said that twelve or thirteen years ago he had given a good deal of thought to compensation by wires of different temperature-coefficients. The first thing he tried was a Wheatstone's bridge. This was compensated by making the bridge-arms of wires whose temperature-coefficients differed—as, for instance, platinoid and copper. He then applied the same principle to the compensation of standard cells, using a potentiometer method that gave direct readings, and to the compensation of voltmeters and watt-meters. These results were published between 1885 and 1890, in the electrical journals. He believed that Mr. Evershed had also developed this idea, by putting "back" turns on voltmeters, and by other differential devices. The details of Mr. Campbell's apparatus had a few points of special interest. The way in which he connected up the bridge (3) seemed particularly worthy of notice. Prof. Ayrton asked whether thermo-electric effects produced difficulty in the compounded arrangement. Mr. Campbell said the system was symmetrical, and the thermal currents were consequently neutralised. Mr. Appleyard, referring to experiment (2), said it was identical with one that had been shown for the past eight years at lectures at Cooper's Hill College. It was specially of interest as illustrating the deflection that occurs with girders and bridges when exposed on one side to sunshine. —Mr. J. Rose-Innes read a mathematical paper on Lord Kelvin's absolute method of graduating a thermometer. Lord Kelvin has investigated the cooling effects exhibited by various gases in passing through a porous plug. He found that for any gas, kept at the same initial temperature, the cooling effects were proportional to the difference of pressure on the two sides of the plug. He also found that, for any one gas, the cooling effect per unit difference of pressure varies approximately as the inverse square of the absolute temperature. This rule holds very well in the case of air; it is not so satisfactory for carbonic acid; it fails for hydrogen. With hydrogen there is a *heating* effect that increases, if anything, when the temperature rises. Mr. Rose-Innes proposes an empirical formula, containing two disposable constants, α and β, characteristic of the gas in question. Denoting by T the absolute temperature, he finds that, very approximately, the cooling effect is given by the expression $(\alpha/T - \beta)$ This relation includes the three cases—air, hydrogen, carbonic acid—under one form, and thus enables them to be treated in one common investigation. Moreover, the differential equation concerned in the thermo-dynamic scale is thereby rendered more manageable; it leads to simpler algebraic results after integration. The paper discusses the thermo-dynamic correction for a constant-pressure gas-thermometer, and the correction for a constant-volume gas-thermometer; also an estimate of the absolute value of the freezing-point of water; the results obtained take, for the most part, a very simple shape, using the above expression for the cooling. Dr. S. P. Thompson said the empirical expression, $(\alpha/T - \beta)$, indicated that at some particular temperature the cooling effect vanished; that was a point suggestive of useful results if investigated by experiment. Mr. J. Walker read a communication from Mr. Baynes on the paper, and remarked upon the desirability of adopting two constants. He thought that further experiments should be made to discover how specific heat at constant temperature depends on temperature. The calculated values for hydrogen were too few to be taken as evidence of the validity of the rule. Mr. Rose-Innes, in reply, said that from what was known of hydrogen, it might be expected to behave at ordinary temperatures as air behaves at higher temperatures. His object was, if possible, to include in one formula the case of the three investigated gases. This was better than having a separate formula for each gas. Whether or not hydrogen was confirmatory with air and carbonic acid, might be considered as *sub judice*; it required further experimental data to test the formula in that case.—The President proposed a vote of thanks to the authors, and the meeting was adjourned until January 21, 1898.

Chemical Society, November 18.—Prof. Dewar, President, in the chair.—The following papers were read:—On the decomposition of camphoric acid by fusion with potash or soda, by A. W. Crossley and W. H. Perkin, jun. Camphoric acid, when fused with alkali, gives a mixture of a number of fatty acids with dihydrocamphoric acid, $C_{10}H_{18}O_4$, pseudocamphoric acid, $C_{10}H_{16}O_4$, and an acid of the composition $C_9H_{16}O_4$; the results are explained and constitutions assigned on the assumption that camphoric acid has the constitution,

$$\begin{matrix} CH_2.CH(COOH) \\ | \\ CMe_2.CMe(COOH) \end{matrix} \rangle CH_2.$$

—Experiments on the synthesis of camphoric acid, by W. H. Bentley and W. H. Perkin, jun. The authors have prepared isobutylmethylhydroxyglutaric acid, $CHMe_2.CH_2.CH(COOH).CH_2.CMe(COOH)OH$, hoping that by loss of water it would give an acid of the constitution assigned in the previous paper to camphoric acid; by loss of water, however, a lactonic acid or its derivatives were usually obtained.—Synthesis of an isomeride of camphoronic acid, by S. B. Schryver.—The action of magnesium on cupric sulphate solution, by F. Clowes and R. M. Caven. When magnesium acts on copper sulphate solution, hydrogen, cuprous oxide, and copper are produced.—Properties and relationships of dihydroxytartaric acid, by H. J. H. Fenton. Dihydroxytartaric acid is readily prepared by oxidising dihydroxymaleic acid in aqueous solution; it gives a quantitative yield of tartronic acid on heating.—The molecular association of liquids and its influence on the osmotic pressure, by H. Crompton. The author shows that Planck and van Laar's demonstrations that association can have no effect on osmotic pressure are invalid owing to faulty reasoning.

Geological Society, December 1.—Dr. Henry Hicks, F.R.S., President, in the chair.—A revindication of the Llanberis unconformity, by the Rev. J. F. Blake. In a paper published in the *Quarterly Journal* of the Society for 1893, the

author of the present paper maintained that certain conglomerates and associated rocks occurring for some distance north east and south-west of Llanberis, which had hitherto been considered to lie below the workable slates of the Cambrian rocks of that area, were in reality unconformable deposits of later date than those slates. In the year 1894 a paper appeared in the same journal, in which the authors maintained that in no case which had been examined could any valid evidence be found in favour of the alleged unconformity, and that in one (on the north-east side of Llyn Padarn) which they supposed to afford the most satisfactory proof of it, the facts were wholly opposed to the notion. The present paper was a reply to these authors, in which their objections, founded on general considerations, on field observations, and on microscopic examination of rock-specimens, were discussed, and the author gave the results of further observations on the rocks of the district.—The geology of Lambay Island, Co. Dublin, by Messrs. C. I. Gardiner and S. H. Reynolds. The authors, who have previously described the neighbouring district of Portraine (*Quart. Journ.* Geol. Soc., December 1897), undertook an examination of this island, with the intention of comparing the rocks with those of Portraine, and of investigating the nature of the rock familiar to geologists under the name of "Lambay porphyry." The sedimentary rocks are similar to some of those of Portraine, and are of Middle or Upper Bala age. Associated with them are pyroclastic rocks and andesitic lava-flows, some of the lavas having flowed beneath the sea. The sediments and volcanic rocks were exposed to denudation, and a conglomerate composed of their fragments was accumulated round the volcano. The "Lambay porphyry," which has been determined as a diabase-porphyry by Dr. von Lasaulx, is partly intrusive in the other rocks, but has in places come to the surface as a lava-flow Petrographical descriptions of the various rocks were given by the authors.

Mathematical Society, December 9.—Prof. Elliott, F.R.S., President, in the chair.—Miss F. Hardcastle communicated a theorem concerning the special systems of point groups on a particular type of base curve.—Mr. Love, F.R.S., gave a sketch of a paper, by Prof. W. Burnside, F.R.S., on the straight line joining two given points.—Impromptu communications were made by Messrs. F. S. Macaulay, A. Berry, and E. T. Whittaker.

Entomological Society, December 1.—Mr. R. Trimen, F.R.S., President, in the chair.—Mr. Dudley Wright exhibited an aberration of *Argynnis euphrosyne*, in which the upperside was suffused with black, and the silver spots of the underside of the hindwings converted into streaks.—On behalf of Mr. W. H. Tuck, Mr. Tutt showed examples of *Metœcus paradoxus*, L., taken in nests of *Vespa vulgaris* near Bury St. Edmunds, together with some of the cells in which they were found. About a fifth of the nests examined were affected, some containing as many as twenty-four, twelve and eight examples of the beetle; the more usual number present was from two to four. The dates between which examples were taken in 1897 were from August 2 to October 1. According to Dr. Chapman the eggs were laid in the cracks of posts, &c., from which the wasps got the pulp to make their cells.—Combs were also exhibited from nests of *Vespa crabro* and *Vespa germanica*, in which Mr. Tuck had found larvæ of *Velleius dilatatus*, Fabr., which, however, he had been unable to rear.—The Rev. A. E. Eaton exhibited a specimen of the singular *Myodites subdipterus*, Fabr., taken by himself at Biskra, Algeria, and a near ally of *Metœcus*.—Mr. Blandford called attention to a new instance of the destructive propensities of *Dermestes vulpinus*, Fabr. He had received examples found at Hong-Kong among flags made of bunting, which were presumably injured, although no details had been forwarded. This form of injury was analogous with the damage to woodwork recorded by himself and others; it had nothing to do with the feeding-habits of the insect, but was committed by the larvæ in their search for shelter in which to pupate. Probably the flags had been stored at some period in the neighbourhood of infested leather goods, or dried provisions. The only other case of damage to textile fabrics by *Dermestes vulpinus* which he knew of occurred in connection with the case recorded by him (*Proc. Ent. Soc. Lond.*, 1890, p. xxxi); a blue handkerchief spotted with white, left in the infested building, was found next day to have all the white spots eaten out.—Mr. Champion communicated papers entitled "Notes on American and other Tingitidæ, with descriptions of two new genera and four species," and "A list of the Staphylinidæ collected by Mr. J. J. Walker, R.N., in the Straits of Gibraltar."

PARIS.

Academy of Sciences, December 6.—M. A. Chatin in the chair.—On the stability of the Eiffel tower, by M. Bassot. The paper is accompanied by four diagrams, showing the motion of the summit of the tower. The conclusion is drawn from these curves, that to verify by periodic observations any permanent displacement undergone by the summit, the measurements should be taken in the evening, two or three hours before sunset, as at that time the irregular movements are at a minimum.—On double integrals of the second species in the theory of algebraic surfaces, by M. Émile Picard.—The first modifications which occur in the fixed cells of the cornea, in the neighbourhood of wounds of that membrane, by M. L. Ranvier. A section is cut perpendicularly to the incisions made in the living animal, and gold staining applied until the fixed cells are nearly black. Those cells which have been cut by the knife at the end of twenty-four hours show budding prolongations by the edges of the wound. These phenomena exhibited by the cells of the cornea of the rabbit are of the same order as the extension by budding of the cylinder axes of cut nerve cells.—On the contamination of wells, by M. Duclaux. By an analytical study of the waters from the shallow wells of a village lately subject to a slight typhoid epidemic, it is shown that a comparatively simple chemical analysis suffices to distinguish between polluted and unpolluted wells, provided that the composition of the water of the district in a pure state is known. The bacteriological method of examination is looked upon as less trustworthy than the chemical method.—Actinometric observations made upon Mont Blanc, by MM. Crova and Hansky. The measurements were carried out in August and September, and were much interfered with by rain. At the summit the maximum value of the solar constant was 3·4, and it is suggested that under more favourable conditions this magnitude might be increased to 4·0.—Observations on the planet (DL) Charlois (1897, November 23) made at the Observatory of Toulouse (Brunner equatorial), by M. F. Rossard.—Application of the method of least squares to the detection of systematic errors, by M. Jean Mascart. A discussion of the conditions under which the application of the method of least squares becomes illusory.—On the approximation of functions of large numbers, by M. Maurice Hamy.—On associated pencils, by M. C. Guichard.—On the focal planes of a curve plane to one or several axes of symmetry, by M. P. H. Schoute.—On the existence of integrals in certain differential systems, by M. Riquier. Elliptical vibrations in fluids, by M. V. Crémieu.—The interference in air of two sound waves of different phases has been studied by observing the motion of a quartz fibre placed at the point of intersection of the waves.—On the dissociation and polymerisation of gases and vapours. Supposed dissociation of chlorine at high temperatures, by M. A. Leduc. The only evidence in favour of the dissociation of chlorine is one isolated observation of M. Crafts at 1400° C.—On the electric conductivity of discontinuous conducting substances, in relation to telegraphy without wires, by M. Édouard Branly.—On the transformation of the X-rays by metals, by M. G. Sagnac. If a bundle of X-rays is allowed to impinge upon a polished metallic surface, such as steel, or a mercury bath, there is no appreciable regular reflexion, but rays, termed by the author secondary rays, can be shown photographically or electrically to be diffused from the surfaces. These radiations show generally all the properties of the original X-rays, but the nature of the metal is not without influence, as the secondary rays from different metals can be distinguished by their unequal transmission by the same substance.—Some new facts observed in Crookes' tubes, by M. Virgilio Machado.—On the accidental causes of irreversibility in chemical reactions, by M. A. Colson. Two reactions are described in detail: the decomposition of normal phosphates by hydrochloric acid, and that of silver sulphate by hydrogen sulphide. In both cases secondary reactions intervene, which render the reversibility of the phenomena impossible.—On the existence of a cuprous sulphate, by M. A. Joannis (see p. 159).—On the elementary unity of the body called cerium, by MM. Wyrouboff and A. Verneuil. A criticism of the results of M. Boudouard, whose atomic weight determinations are stated to be affected both by impurities in his material, and inaccuracy in experimental work.—On aldehyde ammonia, by M. Marcel Delépine. Aldehyde ammonia, when left for three days in a vacuum over sulphuric acid, loses water, giving brilliant white crystals of a new base, ethylidene-imine, which analysis and cryoscopic estimations show to have the formula $(CH_3-CH=NH)_3$. A solution of

aldehyde-ammonia in absolute alcohol gives a crystallised picrate of the same base.—On a reaction peculiar to orthophenols, and on the derivatives of antimonylpyrocatechol, by M. H. Causse.—On the nature of the combinations of antipyrine with aldehydes, by M. G. Patein.—Physiological and therapeutic effects of spermine, by M. Alexander Pœhl. The effects of the alkaloid are uniform, and consist in accelerating the phenomena of oxidation, thus favouring the elimination in the form of harmless products of several poisonous organic secretions.—Disappearance of lead poisoning by the partial substitution of metastannic acid in the putty used in glass polishing, by M. L. Guéroult. The original putty contained 62 per cent. of lead; by the addition of metastannic acid the lead was reduced to 20 per cent. During the six years in which this modified powder has been used, there have been no symptoms of lead poisoning in any form, although, with the original putty, saturnine paralysis was frequent.—On some new colloidal substances, analogous to albuminoids, derived from a nucleo-albumin, by M. J. W. Pickering.—On the development of *Trombidion holosericeum*, by M. S. Jourdain.—Observations on the *Rougets*, by M. P. Mégnin.—Researches on red granules, by MM. J. Kunstler and P. Busquet.—The formations included under the name of red granules appear to be due to a diffraction phenomenon, and have no morphological value.—On a ferment of cellulose, by M. V. Omélianský.—On the decomposition of chloroform in the organism, by MM. A. Desgrez and M. Nicloux. Experiments are described tending to show that during anæsthesia by chloroform some carbon monoxide is produced by the action of the latter upon blood.—On some comparative results of ordinary clinical methods and fluoroscopic examination in pleuretic effusions, by MM. Bergonié and Carrière. The examination by means of the Röntgen rays is valuable in many ways as a supplement to the ordinary clinical methods.—Antagonism between the venom of the *Vespidæ* and that of the viper; the first vaccinates against the second, by M. C. Phisalix.—Permeability of the trunks of trees to atmospheric air, by M. Henri Devaux.—On the disease of chestnuts, by M. E. Roze.—Characteristics of a gas coal found in the northern coal field of New South Wales, by M. C. Eg. Bertrand.—On the fauna of the siderolithic Eocene beds of Lissieu (Rhône), by MM. Ernest Chantre and C. Gaillard.—Mechanical determination of the mean direction of the wind, by M. Louis Besson.

DIARY OF SOCIETIES.

THURSDAY, DECEMBER 16.

ROYAL SOCIETY, at 4.30.—On a Method of Determining the Reactions at the Points of Support of Continuous Beams: G. Wilson.—The Comparative Chemistry of the Suprarenal Capsules: B. Moore and Swale Vincent.—Memoir on the Integration of Partial Differential Equations of the Second Order in Three Independent Variables: Prof. Forsyth, F.R.S.—On the Biology of *Stereum hirsutum*, Fr.: Prof. H. Marshall Ward, F.R.S.—An Examination into the Registered Speeds of American Trotting Horses, with Remarks on their Value as Hereditary Data: F. Galton, F.R.S.—On the Thermal Conductivities of Pure and Mixed Solids and Liquids, and their Variation with Temperature: Dr. C. H. Lees.—Cloudiness: Note on a Novel Case of Frequency: Prof. Pearson, F.R.S.—On the Occlusion of Hydrogen and Oxygen by Palladium: Dr. Mond, F.R.S., Prof. Ramsay, F.R.S., and Dr. J. Shields.—The Relations between Marine, Animal, and Vegetable Life: H. M. Vernon.

LINNEAN SOCIETY, at 8.—On the Affinities of the Madreporarian Genus Alveopora: H. M Bernard.—On West Indian Characeæ collected by T. B. Blow: H and J. Groves.

CHEMICAL SOCIETY, at 8.—Stereo-Chemistry of Unsaturated Compounds. Part I. Esterification of Substituted Acrylic Acids: Dr. J. J. Sudborough and Lorenzo Lloyd.—Formation and Hydrolysis of Esters: Dr. J. J. Sudborough and M. E. Feilmann.—A New Method of Determining Freezing Points of very Dilute Solutions: Dr. M. Wilderman.

FRIDAY, DECEMBER 17.

INSTITUTION OF ELECTRICAL ENGINEERS (Chemical Society's Rooms), at 8.—Accumulator Traction on Rails and Ordinary Roads: L. Epstein.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Elastic Properties of Steel Wire: Archer D. Keigwin.—The Elasticity of Portland Cement: W. L. Brown.

EPIDEMIOLOGICAL SOCIETY, at 8.30.—The Physical and Ethnological Conditions under which Leprosy occurs in China, the East Indian Archipelago, and Oceania: Dr. James Cantlie.

SUNDAY, DECEMBER 19.

SUNDAY LECTURE SOCIETY, at 4.—Some Animal Co-operative Societies: Dr. Andrew Wilson.

MONDAY, DECEMBER 20.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.

IMPERIAL INSTITUTE, at 8.30.—Petroleum Sources of the British Empire: Boverton Redwood.

TUESDAY, DECEMBER 21.

INSTITUTION OF CIVIL ENGINEERS, at 8.—A New Transmission Dynamometer: Prof. W. E. Dalby.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Photomechanical Printing in Connection with the Survey of India: Colonel Waterhouse.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Agriculture in some of its Relations to Chemistry: Prof. F. H. Storer, 3 Vols., 7th edition (Low).—A Run round the Empire: Dr. A. Hill (Sonnenschein).—Studies in the Psychology of Sex, H. Ellis. Vol. 1. Sexual Inversion (Watford, University Press).—La Pratique du Teinturier; J. Garçon, tome 3 (Paris, Gauthier-Villars).—Annuario publicado pelo Observatorio do Rio de Janeiro, 1897 (Rio de Janeiro).—Whittaker's Mechanical Engineer's Pocket-Book: P. R. Björling (Whittaker).—All about Animals (Newnes).—Rainfall Tables of the British Islands, 1866–1890 (Eyre).—Das Problem der Krystallisation: A. Turner (Leipzig, Thomas).—Die Kraft und Materie im Raume: A. Turner, Fünfte Verte Auflage (Leipzig, Thomas).—Arii e Italici: G. Serg (Torino, Fratelli Bocca).—Meteorological Observations made at the Adelaide Observatory, &c., during 1894 (Adelaide) —Annuaire 1898: par le Bureau des Longitudes (Paris, Gauthier-Villars).—Sir James Young Simpson and Chloroform (1811–1870): H. L. Gordon (Unwin).

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CONTENTS.