

## SOCIETIES AND ACADEMIES.

LONDON.

**Royal Society, June 28.**—"The Pharmacology of Ethyl Chloride." By Dr. E. H. Embley.

Four years ago Dr. Embley published the result of an investigation into the pharmacology of chloroform which he had carried out in the physiological laboratory of the University of Melbourne,<sup>1</sup> primarily with the view of elucidating the cause of those sudden misadventures which occur in chloroform administration, and more particularly during the early period of the induction of the anæsthetic.

Dr. Embley's work, however, covered the whole subject of the physiological action of chloroform in a very thorough manner, and perhaps one of the most striking merits which it possessed was due to the fact that the experiments were conducted throughout with definitely known percentages of chloroform in the air respired.

The present work on ethyl chloride is conducted in the same quantitative manner, and with the same command of physiological technique, as shown by the excellent graphic records which illustrate the paper.

Ethyl chloride was first used as a general anæsthetic in 1848 by Heyfelder. It subsequently fell into disuse, but was revived in 1895. Its position is intermediate between nitrous oxide and chloroform or ether.

According to Embley, blood absorbs more than twice as much of the gas as water under similar conditions, so that ethyl chloride, like chloroform, evidently enters into loose chemical union with the blood.

The first point ascertained was the direct effect of ethyl chloride upon the mammalian heart.

Isolation of the heart was obtained by ligation close to the aorta of all the systemic arteries, except the subclavian. By this procedure the circulation was confined to the heart, lungs, and one limb; the nervous system being cut off from its blood supply is instantly put out of action. The pressure in this miniature circulation was recorded by a manometer connected with one carotid artery.

The effect of ethyl chloride upon heart muscle, as is the case with chloroform, and in contrast to ether, was paralytic, but the quantity of ethyl chloride vapour in the air required was nineteen times as great as that of chloroform to produce comparable results.

The direct influence of ethyl chloride upon the arterioles was demonstrated by driving an artificial circulation first through the isolated lungs and then through the isolated intestine of an animal, and measuring the outflow before, during, and after the admixture of definite percentages of ethyl chloride in the air rhythmically pumped into the lungs.

The administration of air containing 20 per cent. to 30 per cent. of ethyl chloride was found directly to paralyse the arterioles. The effect upon the vasomotor system in the intact animal was studied by taking simultaneous records of the arterial blood pressure and of the volume of various organs. These experiments showed that with 20 per cent. to 30 per cent. ethyl chloride in the air respired, a considerable degree of paralysis of the vasomotor system occurred.

Vagus inhibition of the heart was found readily to occur when above 9 per cent. of ethyl chloride vapour was present in air. Between 10 per cent. and 20 per cent. inhibition caused sudden fall of blood pressure and cessation of circulation. These effects upon the heart were due to stimuli passing down the vagi from the central nervous system, for on cutting these nerves the circulation was instantly resumed. This sudden inhibition of the heart was not, however, nearly so dangerous as the same effect easily produced by chloroform, for the direct paralytic effect of ethyl chloride upon the heart muscle is comparatively insignificant, so that in the majority of cases recovery of the circulation readily occurred if the administration were suspended.

The effect of ethyl chloride upon the respiration is also dealt with. Ethyl chloride gradually reduces the rate and extent of the respiratory movements, and if pushed in sufficient concentration will ultimately lead to their cessation. The same interdependence between respiratory

<sup>1</sup> "The Causation of Death during the Administration of Chloroform" (*British Medical Journal*, April 5, 12 and 19, 1902).

activity and blood pressure was brought out, as had been shown by Leonard Hill and the author, to obtain in chloroform poisoning. Provided the circulation were maintained, it was found nearly impossible to produce cessation of respiration, but directly serious fall of blood pressure occurred, owing to inhibition of the heart, the respiration immediately became very shallow or ceased, but returned again directly the circulation recovered.

The primary danger in the administration of ethyl chloride to dogs, as in the case of chloroform, is syncope from inhibition of the heart, brought about by the stimulating action of these drugs upon the cardiac-inhibitory centre in the medulla. As it is a stimulating action, it is more prone to occur in the early stages of administration before these nerve centres are themselves narcotised by the drug.

"Refractive Indices of Water and Sea-water." By J. W. Gifford. Communicated by W. A. Shenstone, F.R.S.

Reference is made to previous papers (*Roy. Soc. Proc.*, February 13, 1902, and March 3, 1904). The same special method of observation has been adopted. Measurements of the refractive index of water for twenty-six wave-lengths and of sea-water for twelve wave-lengths are contained in the paper. Those of sea-water were made for the purpose of computing an under-water lens, since successfully constructed for submarine use. The measurements were made at an approximate temperature of 15° C., but were also corrected by means of temperature refraction coefficients.

The error is estimated as in no case exceeding 0.000025, and in most cases not exceeding 0.000015. The index of water for line D, reduced to 20° C. by the temperature coefficient, is 1.333032. Dufet ("Recueil de Données numériques," vol. i., p. 83) gives 1.33303 as the mean of the measurements of twenty-nine different observers for that line and temperature. The measurements were made on the goniometer used before (*loc. cit.*), but have been checked by critical work on a much larger instrument.

The distilled water was prepared in platinum vessels by Mr. Bousfield; the sea-water was taken five miles from shore by Lieut. E. R. G. Evans, R.N.

November 8.—"On a Compensated Micromanometer." By B. J. P. Roberts. Communicated by Sir John I. Thornycroft, F.R.S.

The principle of the gauge is similar to that of Sir W. Siemens's bathymeter. The instrument described consists of a U tube having the limbs connected by a tube of small bore, the motion of the fluid in this small-bore tube being rendered visible by means of an air-bubble index. The sensitiveness depends on the ratio between the bores of the limbs and the connecting tube, and also partly on the nature of the fluid employed. The fluid should have a low surface tension, and the bore of the connecting tube should preferably not exceed 1.5 millimetres. The length of the bubble should be made equal to the distance between the centres of the upright limbs—the readings will then be practically unaffected by changes of level; the readings are also indifferent to vibration or similar disturbing causes. No fluid will pass the bubble provided certain precautions are observed—of these the most important is keeping the rate of movement of the bubble from exceeding certain limits. An attachment for preventing loss of fluid by evaporation is suggested in some cases.

"The Composition of Thorianite and the Relative Radio-activity of its Constituents." By Dr. E. H. Büchner. Communicated by Sir W. Ramsay.

Various investigations on residues from the mineral thorianite, carried out in the laboratory of Sir William Ramsay, made it desirable to analyse a large amount of this mineral, and to determine how its radio-activity is distributed over its constituents. About 24 grams were dissolved in boiling nitric acid, and left only a small residue behind, which was then fused with hydrogen potassium sulphate. The fused mass dissolved almost completely in water. The solutions obtained were then treated in the ordinary way and separated in the various groups. Pb, Cu, Sn, Sb, Fe, Al, Ur, Th, Ce, Zr, Ti, Ca, He, CO<sub>2</sub>, and water were quantitatively determined; the greater part of these elements are present in very small quantities.

The determination of the more important ones gave the following results:—PbO, 2.42 per cent.; Fe<sub>2</sub>O<sub>3</sub>, 3.35 per cent.; U<sub>3</sub>O<sub>8</sub>, 13.12 per cent.; ThO<sub>2</sub>, 70.96 per cent.; Ce<sub>2</sub>O<sub>3</sub>, 1.96 per cent. From 1 gram of the mineral 8.2 c.c. of helium were obtained. The original mineral possesses 83.3 per cent. of the activity of standard uranium oxide. The greater part of the constituents proved to be radio-active, though some only in a very slight degree. Nearly 60 per cent. of the activity of the mineral is allied to the thoria, about 9 per cent. to the uranium. The strong activity of the iron appears to be due to the presence of Hahn's radio-thorium. The activity of several precipitates increased during the time between two measurements, while others showed a decreasing activity, which sometimes even disappeared. It may be assumed that these precipitates are so-called X-substances; one of them resembles in its chemical behaviour a platinum metal.

**Zoological Society, November 13.**—Mr. Howard Saunders, vice-president, in the chair.—A very young embryo of the okapi (*Okapia johnstoni*) obtained by Dr. T. David from a specimen shot in the Semliki Forest: Prof. R. Burckhardt. The object not being well preserved and in an early stage, it could only be stated that all the particulars ascertainable were specially ungulate in character.—Description of a new species of turbellarian obtained during Dr. W. A. Cunnington's expedition to Lake Tanganyika: F. F. Laidlaw.—List of a second collection of mammals made in Western Australia for Mr. W. E. Balston, with field-notes by the collector, Mr. G. C. Shortridge: Oldfield Thomas. This second collection was made in the Avon watershed, and consisted of about 350 specimens, of which a fine series had been presented to the National Museum by Mr. Balston. In all, forty-two species were enumerated, and of these Mr. Shortridge gave notes on the distribution and comparative rarity at the present time, such notes being of particular value in the case of a disappearing fauna like that of Australia. An appendix dealt with a small series obtained on Bunier Island, Shark's Bay, on the north-west coast of Australia.—Sixth instalment of the results of the Rudd exploration of South Africa: Oldfield Thomas and H. Schwann. This contained an account of the mammals obtained by Mr. C. H. B. Grant in the eastern Transvaal. Twenty-one species were represented in the collection, of which one was new.—The Mollusca of the Persian Gulf, Gulf of Oman, and Arabian Sea, as evidenced mainly through the collections of Mr. F. W. Townsend, 1903-5, with descriptions of new species, part ii., Pelecypoda: J. Cosmo Melvill and R. Standen. A continuation of the enumeration of the Mollusca of the above-named seas published in the Proc. Zool. Soc., vol. ii., 1901, and completing the catalogue, the total number embraced being nearly sixteen hundred species, many of these being found to be new to science. Among the Pelecypoda, Tellina holds the premier place; most orders and families are, however, represented, and the result is a very refined and varied molluscan fauna. Some interesting forms occur among the Lardiacea, while the Pectinidæ show alliance and, in some cases, specific identity with the Erythraean fauna, monographed by Dr. Sturany.

November 27.—Mr. Howard Saunders, vice-president, in the chair.—Notes on the habits of the lesser horseshoe bat, *Rhinolophus hipposiderus*: T. A. Coward. This bat usually occupies different retreats in summer and winter, and during the earlier period of occupation of the winter retreat sleep is not profound. The bats feed probably in the caves or retreats, and the food is at times, if not always, consumed when the animal is at rest and not on the wing. When feeding it does not—probably could not—make use of the interfemoral membrane, after the manner of the Vespertilionidæ, but, as a substitute, the inter-brachial membrane is employed. These facts suggest that the hibernation of this species, and probably of other cave-haunting bats, is not really a profound winter sleep.—An account of four species of Solenidæ contained in the collections made by Mr. Cyril Crossland in Zanzibar and British East Africa in 1901-2: E. A. Smith and H. H. Bloomer.—Attempt to explain the existence of the so-called "renal-portal" system: W. Woodland.—The anatomy of *Centro-*

*phorus calceus*: W. Woodland. The author described in particular the anatomy of the alimentary tract, which differs in several respects from that of most Selachians and, as regards the length of the bile-duct, from most vertebrates.—Mammals collected in Korea and Quelpart Island by Mr. Malcolm P. Anderson for the Duke of Bedford's exploration of Eastern Asia: Oldfield Thomas. The collection consisted of about 130 specimens, belonging to nine species, of which four were described as new. Quelpart Island proved to contain a very poor mammal fauna, and the only specimens obtained there were a *Putorius* and a *Micromys*, both identical with forms found on the Korean Peninsula.

**Linnean Society, November 15.**—Prof. A. W. Herdman, F.R.S., president, in the chair.—A series of twenty-one specimens of *Polygala amarella*, Crantz, selected to show its wide range of form under various conditions: J. Cryer.—The Fjærlands Fjord, Norway: H. W. Monckton. During the past summer the author spent a fortnight at Mundal, on the Fjærlands Fjord, and he had paid short visits to the same place in previous years. The fjord is a long arm running from the Sogne Fjord in a north-easterly direction, and snow-fields lie near the fjord on both sides, though at a considerable altitude above it. Mundal is about ninety miles from the open sea, but *Fucus* grows well on the rocks and foreshore, and *Mytilus* and *Cardium* flourish. The author considered, among other subjects, the question to what extent the snow-fields and glaciers of Norway can be looked upon as relics of the Glacial period.

**Anthropological Institute, November 12.**—Prof. W. Gowland, president, in the chair.—A visit to the Hopi Indians at Oraibi: W. Crewdson. The visit took place in November, 1905, when it was late to travel across the plains of Arizona; but by starting from Canyon Diablo, on the Santa Fe route, with relays of horses, the seventy miles to Oraibi was accomplished in one day. Oraibi is the most conservative of Indian towns, practically unaltered by Western civilisation, and shows examples of primitive life in our own days, several of the implements used being still of stone; the bows and arrows and boomerangs are also used for killing game. One of the most striking characteristics of the Hopi men is their marvellous power of running; for this they are trained as children by one of the chief men, who stands on one of the Mesas and sees the young men take a twenty-mile run before commencing the day's work. The necessity for this was owing to their fields being many miles distant from their homes. The result is that a Hopi will sometimes run forty miles to his fields, cultivate them, and then run home again, all within the twenty-four hours. In the house, which is built by the woman, she rules absolutely; the children take the mother's name; the men weave the garments for both themselves and their wives, and are at any time liable to be definitely turned out of their homes, possibly after a forty-mile run, by the wife who has grown tired of her husband. These Indians are intensely religious, most of their ceremonies, which often last for days, being really prayers for rain. Their pottery is interesting, being decorated to a large extent with cloud symbols, and many pieces have a break in the design to allow the spirit which is supposed to be imprisoned in the design free ingress and egress. This idea bears a curious resemblance to the idea, once prevalent in England and elsewhere, that if a circle was drawn round a witch she could not escape unless someone cut the circle for her from outside. The celebrated snake-dance, which has been so often described, takes place in August, and it is becoming more and more probable that these Indians are really acquainted with a cure for snake-bite. In November, however, the dance of the year, only second to the snake-dance, and called the basket-dance, takes place. The lecturer was present at this, having previously been admitted to the Kiwa, or underground chamber, where the preparatory rites in connection with the ceremony take place.—The relative stature of the dolichocephalic, mesocephalic, and brachycephalic inhabitants of East Yorkshire: J. R. Mortimer. The inhabitants are divided into two classes, those of the Neolithic and Bronze period,

and those of the Early Iron period. Of those in the first class, the dolichocephals are found to have the greatest stature and the mesaticephals the smallest stature, while in the second class the mesaticephals have the greatest stature and the brachycephals the shortest stature. There is, therefore, no simple relation between stature and skull length. The number of skulls examined was 151.

**Geological Society, November 21.**—Sir Archibald Geikie, Sec.R.S., president, in the chair.—The Kimeridge Clay and Corallian rocks of the neighbourhood of Brill (Buckinghamshire): A. M. **Davies**. The paper contains two principal divisions:—(1) an account of the section of Rid's Hill, Brill; (2) the rock of Studley and Arngrove, described by Phillips as an argillaceous chert, is shown to be mainly composed of the globate spicules of the tetractinellid sponge Rhaxella. Palæontological notes are given on certain species of Lamellibranchia and Annelida, chiefly from the Lower Kimeridge Clay.—The skull and greater portion of the skeleton of *Goniopholis crassidens* from the Wealden Shales of Atherfield (Isle of Wight): R. W. **Hooley**. In the late autumn of 1904, at a place locally called "Tie Pits," near Atherfield Point, a huge mass of the cliff, comprising many thousand tons of the Wealden Shales, subsided, pushing its foot across the beach until below low-water line. As the sea washed away the base, the mass continued to sink, and fresh horizons were denuded. In 1905 a series of heavy "ground-seas" cast up blocks of limestone and ironstone, containing crocodile bones, which were discovered on the sand between high- and low-water marks. The skull came ashore in six pieces. Fragments of bones and scutes were constantly picked up. The specimens were derived from a horizon 80 feet to 90 feet below the top of the Wealden Shales.

**Entomological Society, November 21.**—Mr. F. Merrifield, president, in the chair.—*Exhibitions*: H. W. **Andrews**: Specimens of *Odontomyia angulata*, Pz., from the Norfolk Broads, of which species few captures have been recorded of recent years, and *Ictericia westermanni*, Mg., a rare Trypetid, taken in the New Forest.—Dr. F. A. **Dixey**: Specimens of South African Pierinæ demonstrating that the wet-season form of *Teracolus regina*, Trim., is in mimetic association with an undescribed species of *Belenois*, intermediate between *B. calypso* and *B. thysa*.—H. and F. **Campion**: A male specimen of *Sympetrum vulgatum* taken in Epping Forest on September 4 last, of which species there are recorded only three other authentic British specimens.—R. **Adkin**: A short series of *Tortrix pronubana*, Hb., including both sexes, reared from larvæ and pupæ collected from eunonymus at Eastbourne in September. The only previous records for the species in Britain are single male examples captured at Eastbourne and at Bognor.—Dr. T. A. **Chapman**: A long series of *Coenonympha mathewi*, Tutt, from different places in the north-west corner of Spain (Galicia), and from which it was concluded that *C. mathewi* is a geographical or sub-specific variety of *C. dorus*, and not a fully established species.—*Papers*.—A permanent record of British moths in their natural attitudes of rest, and Further notes on the choice of a resting site by *Pieris rapae*: A. H. **Hamm**.—Studies of the Blattidæ: R. **Shelford**.—Notes on the life-history of *Sesia andrenaeformis*, Lasp.: Hon. N. Charles **Rothschild**.—Notes on an unusual emergence of *Chrysophanus salustius* in New Zealand: H. W. **Simmonds**.

## PARIS.

**Academy of Sciences, December 3**—M. H. Poincaré in the chair.—A new and rapid method for the determination of the errors of division of a meridian circle: M. **Loewy**. A continuation of previous papers on the same subject. The method is modified to allow of the direct determination of the correction of the twenty standard points.—The specific adjuvants of experimental parthenogenesis: Yves **Delage**. It has been found that the addition of certain salts to the solution usually employed in parthenogenesis (common salt, sea water, and distilled water) considerably augments the power of the latter as a parthenogenetic agent. Such substances are the chlorides of manganese, cobalt, and nickel, the last-named being the most active. This result is unexpected, and no satis-

factory explanation has as yet been found. Different eggs, even from the same ovary (of the sea-urchin), present considerable differences, differences which neither the superficial nor histological examination offer any assistance in explaining.—Concerning the expedition organised for the study of sleeping sickness: A. **Laveran**.—Pulmonary physiological anthracosis of intestinal origin: MM. **Calmette**, **Vansteenberghe**, and **Grysez**. A repetition and extension of previous experiments in answer to the objections raised by other workers on the same subject, especially Küss and Lobstein. The authors conclude, in confirmation of their previous work, that besides anthracosis of respiratory and pure mechanical origin, the existence of which they have never denied, it is necessary to admit the existence of physiological anthracosis of intestinal origin.—Observations of the comet 1906h made with the large equatorial of the Observatory of Bordeaux: Ernest **Esclangon**. The observations were made on November 22 and 23, and give the apparent positions of the comet and mean positions of the comparison stars. The comet appeared as a uniform nebulosity 30" in diameter, and without apparent nucleus.—Observations of the Thiele and Metcalf comets (1906g and 1906h) made at the Observatory of Algiers: MM. **Rambaud** and **Sy**. The observations were made on November 13, 14, 16, 19, and 20, the last night furnishing the best results. On November 20 the comet 1906h appeared as an irregular nebulosity, the lustre being comparable with that of a star of the twelfth magnitude.—Observation of the Metcalf comet (1906h) made at the Observatory of Lyons: J. **Guillaume**. A single observation on November 20. The comet had the appearance of a circular nebulosity of about 30" diameter, with a central condensation and a small nucleus. Its lustre was about the eleventh magnitude.—Certain transcendental numbers: Edmond **Maillet**.—The critical points of inverse functions: A. **Hurwitz**.—Periodic functions: P. **Cousin**.—The diffusion of solutions of copper sulphate in gelatin: M. **Yegounow**. Copper sulphate appears to enter into combination with gelatin, but its movement rigorously follows Stefan's law.—Potential equalisers: M. **Moulin**. The combustion of filter paper impregnated with quantities of lead nitrate varying from 2 per cent. to 5 per cent., according to the conditions of wind, has given accurate results. The use of flames or radium salts requiring many precautions has been found less practical.—Researches on gravitation: N. **Crémieu**.—A theoretical explanation of the magneto-optic phenomena observed in a crystal: Jean **Becquerel**.—An apparatus for compensating the inertia of selenium: A. **Korn**. A device for overcoming the inertia of the selenium cell in telephotography.—Positive charge at a distance in an electric field under the influence of ultra-violet light: Mme. **Baudeuf**.—The reduction of oxide of chromium by boron: Binet **du Jassonneix**. The reduction of oxide of chromium by boron in magnesia crucibles at the temperature of the electric furnace gives ingots attackable by hydrofluoric, hydrochloric, and sulphuric acids. These may contain from 5 per cent. to 17 per cent. of combined boron. If boron is present in higher proportions it exists as the carbide of boron. The boride CrB constitutes the limit of saturation of chromium by boron.—An extremely sensitive method for the precipitation of zinc: Gabriel **Bertrand** and Maurice **Javillier**. The method is based on the production of a crystallised, insoluble calcium zincate. Quantitative determinations of zinc can be made in this way in solutions containing only two parts of zinc in a million. Even at ten times this dilution the zinc can be qualitatively detected with certainty.—Nitriles and carbamides: P. **Lemoult**. Determinations of the heats of combustion and formation of methyl and ethyl carbamides. From thermochemical data hydrocyanic acid is considered to be a carbamide, and not a nitrile.—The action of reagents on ethyl glyoxylate: L. J. **Simon** and G. **Chavanne**. The ethyl glyoxylate was prepared by the electrolysis of ethyl oxalate, and its reaction with phenylhydrazine, hydroxylamine, and semicarbazide studied.—The esterification of arsenious anhydride by alcohols and phenol: V. **Auger**. A limited amount of alkyl ester is produced by heating together arsenious anhydride and the anhydrous alcohol. If the experiment is arranged so that the water produced in the reaction is removed (with

calcium carbide), a good yield of the arsenite is produced. The physical properties of propyl, normal butyl, and isobutyl arsenites are given.—The orthosubstituted azo-acids and their transformation into *c*-oxyindazylic derivatives: P. **Freundler**.—The condensation of oxalacetic ester with cyanacetic ester in presence of piperidine: Ch. **Schmitt**. The condensation can take place in two ways, giving rise to isomeric substances possessing different properties.—The replacement of hydroxyl of some carbinols by the radical  $-CH_2CO_2H$ : R. **Fosse**.—The constitution of hordenine: E. **Léger**. The regulated oxidation of acetyl-hordenine with potassium permanganate gives acetyl-para-oxbenzoic acid. This fixes the orientation of the hydroxyl group in hordenine, which is thus found to be para-oxyphenylethyl-dimethylamine.—The volcanic rocks of the peninsula of Cape Verde (Senegal): Jean **Chautard**.—The presence of galena amongst the minerals produced by the fumerolles of the last eruption of Vesuvius: Ferruccio **Zambonini**. Referring to a recent paper by M. Lacroix on this subject, the author mentions that he contributed a paper on the same subject to the Accademia dei Lincei in August last.—The intracellular inclusions of the leaf of *Rhamnus cathartica*: Wladimir **Tichomirow**.—The evolution of the metachromatic corpuscles of seeds during germination: J. **Beauverie**.—The histological modifications produced in the flowers of *Teucrium Chamaedrys* and of *Teucrium montanum* by the larvæ of Copium: C. **Houard**.—The coral formations of the island of San-Thomé, Gulf of Guinea: Ch. **Gravier**.—A respiratory calorimetric room: M. **Letulle** and Mlle. **Pompilian**. A diagram is given of the apparatus, which allows of simultaneously measuring the respiratory exchanges and heat evolved by a man over a long period. The heat is determined by reading the inlet and outlet temperatures of a measured flow of water, the regulation of the temperature of the calorimeter being made automatically at any desired point between 12° C. and 24° C. The apparatus was standardised electrically with a possible error of 0.5 per cent.—The rôle of the chromotropic phenomena in the study of biological and psychophysiological problems: Romuald **Minkiewicz**.—The prophylaxy of glandular cancer of the prostate: A. **Guepin**.—The production in medicine of static effects by high frequency resonators: H. **Guilleminot**.

DIARY OF SOCIETIES.

**THURSDAY, DECEMBER 13.**  
**ROYAL SOCIETY**, at 4.30.—The Relation between Breaking Stress and Extension in Tensile Tests of Steel: A. Mallock, F.R.S.—On the Intensity of Light Reflected from Transparent Substances: Prof. R. C. Maclaurin.—Contributions to our Knowledge of the Poison Plants of Western Australia, Part II., *Oxylobium paviflorum*. Lobine: E. A. Mann and Dr. W. H. Ince.—Experiments on the Length of the Kathode Dark Space with Varying Current Densities and Pressures in Different Gases: F. W. Aston.—An Examination of the Lighter Constituents of Air: J. E. Coates.—The Velocity of the Negative Ions in Flames: E. Gold.—The Electric or Magnetic Polarisation of a Thin Cylinder of Finite Length by a Uniform Field of Force: Dr. T. H. Havelock.—Further Observations on the Effects produced on Rats by the Trypanosomata of Gambia Fever and of Sleeping Sickness: H. G. Plimmer.  
**SOCIETY OF ARTS**, at 4.30.—The Indian Mohammedans: their Past, Present, and Future: A. Yusuf Ali.  
**LONDON INSTITUTION**, at 6.—Tadpoles—a Study in Embryology: D. J. W. Jenkinson.  
**MATHEMATICAL SOCIETY**, at 5.30.—On the Form of the Surface of a Search-light Reflector: C. S. Jackson.—The Potential Equation and Others with Function given on the Boundary: L. F. Richardson.—On the Limits of Real Variants: J. Mercer.—The Asymptotic Expansion of Integral Functions defined by Generalised Hypergeometric Series: Rev. E. W. Barnes.—The Diophantine Equation  $x^n - Ny^m = z$ : Major P. A. MacMahon.—The Uniform Convergence of Fourier's Series: Dr. E. W. Hobson.  
**FRIDAY, DECEMBER 14.**  
**PHYSICAL SOCIETY**, 7 p.m. to 10 p.m.—Second Annual Exhibition of Electrical, Optical, and other Physical Apparatus.  
**ROYAL ASTRONOMICAL SOCIETY**, at 5.—(1) Observations of Comet *c*, 1905, and Comets *a* and *b*, 1906, from Photographs taken with the 30-inch Reflector of the Thompson Equatorial; (2) Pogson's Observations of U Geminaurum, edited by H. H. Turner: Royal Observatory, Greenwich.—Hansteen's Eclipse at Stiklastad, 1030 August 31: P. H. Cowell.—The Proper Motion of Castor: A. C. D. Crommelin.—Note on some Proper Motions derived from a Comparison of Carrington's Catalogue, 1855: W. G. Thackeray.—Note on the Approaching Return of Halley's Comet: A. C. D. Crommelin.—On the Accidental Production of Temporary Errors of Division on a Graduated Circle: W. M. Mitchell.—*Probable Papers*: (1) Note on Silicon in the Chromosphere; (2) The Enhance<sup>d</sup> Lines of Iron in the Region C to F: A. Fowler.—Estimate of the Number of Stars within Certain Limits of Proper Motion: W. G. Thackeray.—Discussion (*time permitting*): Possibility of Improving the Places of

Reference Stars for the Astographic Catalogue: H. H. Turner.—Solar Parallax Papers, No. 5, Photographic Places of Stars in the Paris *Eros* Circular: A. R. Hinks.  
**INSTITUTION OF CIVIL ENGINEERS**, at 8.—Mechanical Improvements in the Drainage of the Bedford Level: A. Carmichael.  
**INSTITUTION OF MECHANICAL ENGINEERS**, at 8.—*Discussion*: Steam as a Motive Power for Public Service Vehicles: T. Clarkson.—*Probable Paper*: Lighting of Railway Premises; Indoor and Outdoor: H. Fowler.  
**MALACOLOGICAL SOCIETY**, at 8.—Description of *Lalirus (Peristernia) Sowerbyi*, sp.n.: J. Cosmo Melvill.—On the Anatomy of *Tagelus gibbus* and *T. divinus*: H. H. Bloomer.—Descriptions of two New Helicoid Forms from German New Guinea: J. H. Ponsoy.  
**MONDAY, DECEMBER 17.**  
**SOCIOLOGICAL SOCIETY**, at 8.—Sociology as a Province of Biology: M. Maxweiler.  
**SOCIETY OF ARTS**, at 8.—Artificial Fertilisers: Potassic Fertilisers: A. D. Hall.  
**INSTITUTE OF ACTUARIES**, at 5.—On the Error introduced into Mortality Tables by Summation Formulas of Graduation: G. King.

TUESDAY, DECEMBER 18.

**ROYAL STATISTICAL SOCIETY**, at 5.  
**SOCIETY OF ARTS**, at 8.—Basket Making: Thomas Okey.  
**INSTITUTION OF CIVIL ENGINEERS**, at 8.—Mechanical Considerations in the Design of High-tension Switch-gear: H. W. E. Le Fanu.

WEDNESDAY, DECEMBER 19.

**SOCIETY OF ARTS**, at 8.—Modern Developments of Flour-milling: A. E. Humphries.  
**ROYAL METEOROLOGICAL SOCIETY**, at 7.30.—The Guildford Storm of August 2, 1906: Admiral J. P. Maclcar.—The Metric System in Meteorology: R. Inwards.  
**ROYAL MICROSCOPICAL SOCIETY**, at 8.—Exhibition of Slides from the Collection presented to the Society by Mr. Jas. Hilton.

THURSDAY, DECEMBER 20.

**INSTITUTION OF ELECTRICAL ENGINEERS**, at 8.—The Track Circuit as Installed on Steam Railways: H. G. Brown.  
**LINNEAN SOCIETY**, at 8.—Botanical Results of the Third Tanganyika Expedition, 1904-5: Dr. A. B. Rendle and others.—Fossil Foraminifera of Victoria; the Balcombian Deposits of Port Phillip: F. Chapman.—*Exhibition*: Albino Woodlice: Wilfred Mark Webb.  
**CHEMICAL SOCIETY**, at 8.30.—A New Laboratory Method for the preparation of Hydrogen Sulphite: F. R. L. Wilson.—The Reaction of Acids with Methyl Orange: V. H. Veley.—(1) Contributions to the Study of the Calcium Phosphates, I., The Hydrates of the Calcium Hydrogen Orthophosphates; (2) Contributions to the Study of the Calcium Phosphates, II., The Action of Ammonia Gas on the Calcium Hydrogen Orthophosphates: H. Bassett, jun.

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