land Meteorological Society on April 15. The chief subject of discussion was climatic changes, which were considered in two divisions: (*a*) Secular changes, introduced by Prof. W. M. Davis. He stated that secular variations have undoubtedly taken place, but we cannot give specific explanations of them. (*b*) Supposed recent changes, introduced by Prof. W. Upton. Several long series of observations were examined, and, while slight indications of periodicity were found, there was no trace of progressive change.—Trombes and tornadoes, by M. H. Faye (concluded from the May number).—Method of determining the direction of the wind by observation of the undulations at the margins of the disks of the heavenly bodies, especially the sun and moon, viewed through a telescope, by Don V. Ventosa, of the Madrid Observatory. The author states that there are always two points on the limb diametrically opposite, where the undulations travel tangentially to it and in the same direction, while in intermediate regions the waves appear more or less inclined to the limb. These motions indicate by their directions those of the wind which produces them.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 19.—"On the Changes produced in the Circulation and Respiration by Increase of the Intracranial Pressure or Tension." By Walter Spencer, M.S., Assistant Surgeon to Westminster Hospital, and Victor Horsley, B.S., F.R.S.

The authors have made for some time the effect of an increase in intracranial pressure or tension the subject of an experimental inquiry, so far as the increase affects the circulation and respiration.

They conclude that the increase in intracranial pressure influences the circulation and respiration through the diminution in the physiological activity of the medulla which it causes.

The authors first give an historical *résumé* of the work of previous observers.

The following is a summary of the chief results obtained :—

I. *The Heart.*—A considerable increase of the intracranial tension was required to influence the heart; it became slowed and finally arrested. This happened more readily after respiration had ceased, and required a higher pressure to produce it when artificial respiration was employed, whilst division of both vagi nerves abolished any slowing or arrest. The arrest, when produced, continued permanently, unless the pressure was quickly removed, or artificial respiration employed, or the vagi divided. But if the pressure was maintained whilst artificial respiration enabled the heart to start again, then the cardio-inhibitory influence was gradually lost, so that the heart returned from being very slow to its normal rate, or increased beyond the latter until the rate became equal to that seen after division of the vagi. When the vagi were divided at this stage the rate of the heart did not alter.

The Blood Pressure.—A primary rise, small in the dog, larger in the monkey, was followed by a fall distinct from that produced by the slowing of the heart, and not necessarily accompanying it. When the heart started again the blood pressure rose, finally reaching the level seen after division of the vagi, so that no further rise took place when this was done. The power of producing a fall of blood pressure was easily lost. After division of the vagi the blood pressure was raised by increasing the intracranial tension and by artificial respiration, so that it could be maintained at a level between 300 and 400 mm. Hg for considerable periods.

Respiration.—This was likewise impaired and arrested. Its arrest reacted upon the heart and the blood pressure upon it, so that after the rise of blood pressure respiration occurred, even although a much higher intracranial tension was maintained than had been sufficient to arrest it when the blood pressure was lower.

II. By the direct application of pressure in the upper part of the 4th ventricle a slowing of the heart with a rise of blood pressure was caused, whilst respiration continued, so rapid as even to be nearly three times the rate of the heart in some cases. Pressure below the calamus scriptorius arrested the respiration without directly influencing the heart, whilst in the lower part of the 4th ventricle respiration was impeded or arrested along with a fall in blood pressure, and some slowing of the heart, followed by arrest, after the respiration had ceased.

"On the Alleged Slipping at the Boundary of a Liquid in Motion." By W. C. Dampier Whetham, B.A., Coutts Trotter Student of Trinity College, Cambridge. Communicated by J. J. Thomson, M.A., F.R.S., Cavendish Professor of Experimental Physics, Cambridge.

The experiments of Helmholtz and Piotrowski on the oscillations of a metal sphere suspended bifilarly, and filled with various liquids, gave finite values to the slipping coefficients. The theory of the flow of liquids through capillary tubes, applied to these results, show that such an effect would produce a marked change in the time of flow of a given volume of liquid. Poiseuille showed that for a glass tube there was no slip, and it follows that the flow through a gilt tube of about a millimetre in diameter should be twenty times as fast as through a glass one.

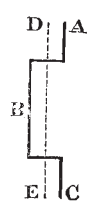
The time of flow of a given quantity of water through a glass tube was observed, and the interior of the tube was then silvered. The time was always the same for the glass and for the silver surface. The velocity of flow was varied within wide limits, and pushed near the point at which the flow ceases to be linear.

Other experiments were made on drawn copper tubes, which also agreed with Poiseuille's laws. Even when the interior surface was modified by cleaning with acids and alkalies, polishing with emery powder, coating with oil, or amalgamating with mercury, there was no change in the rate of flow. There is certainly no slip with substances which are wetted by the liquid.

Some preliminary experiments of Piotrowski on an oscillating glass flask, the interior of which was afterwards silvered, were then repeated, and it was shown that, when more precautions than Piotrowski took were used, the friction on the flask was the same, whether the surface was glass or silver.

Physical Society, June 20.—Prof. W. E. Ayrton, F.R.S., President, in the chair.—Prof. A. W. Worthington made a communication on the stretching of liquids. The three known methods by which this may be effected—viz. the barometer tube method, the centrifugal method, and the method of cooling—were described, and the precautions necessary in filling the tubes and in freeing the liquids from air discussed. With non-volatile liquids, such as sulphuric acid, the tubes are put in communication with a good pump, and before sealing, the liquid in the tube is kept at a higher temperature than that in the communicating vessel, in order that a stream of vapour may be passing outwards and carry with it any air liberated from the glass during the process of sealing. Before using tubes by the centrifugal method the author finds it advantageous to subject them to considerable "jarring" at intervals. This usually breaks the liquid column, and liberates a small bubble of air which may then be floated out. By repeating this many times, the adhesion of the liquid is greatly increased. With these precautions he had subjected water to a tension of 7·9 and sulphuric acid to one of 12 atmospheres. The cooling method of Berthelot (*Ann. de Chemie*, xxx., 1852) was then tried. In this method the liquid nearly fills a strong closed glass tube at a particular temperature. On slightly heating, it expands and fills the whole tube, any residual air being dissolved. On cooling again, the liquid remains extended, and still fills the tube until at last it lets go with a violent "click," and the bubble of residual air and vapour reappears. The tension of the liquids tested under these circumstances have usually been calculated from the relative change of volume on the assumption that the coefficient of extensibility is the same as that of compressibility. The author exhibited and described an apparatus by which the tension and the extension can be measured simultaneously. The tension is ascertained from the enlargement of the ellipsoidal bulb of a thermometer sealed into the containing vessel, and the extension calculated from the volume of the bubble after the click. The tension thermometer had been calibrated by internal pressure, and in determining the extension, correction is made for the change of volume of the apparatus. By this method he had subjected alcohol to a tension of 17 atmospheres, and found that the coefficient of extensibility is much less than that of compressibility. It is not clear what causes the liquid to let go of the glass, but it is found that the bubble can be caused to reappear by passing an electric current through a wire sealed in the capillary tube. Sir Wm. Thomson remarked that Prof. Worthington's paper was a curious commentary on the usual mathematical definition of "a liquid" as a substance which offered no resistance to being separated into parts. Speaking of freeing liquids from air, he said the beneficial effect of jarring could

easily be shown by tapping an ordinary "philosophical hammer"; separation of the column always leaves a bubble which can then be floated off. He had also found that, in freeing liquids from air by boiling, it was advantageous to have a long escape tube so that part of the liquid condenses and runs back.—Mr. C. V. Boys read a paper on the measurement of electromagnetic radiation by himself, Messrs. A. E. Briscoe and W. Watson. When Mr. Gregory described his new electric radiation meter on November 1, 1889, one of the authors said that the observed effect might be due to some cause other than expansion by heating, and that if it was a true heating effect it might be measured thermally. The present communication describes experiments undertaken to investigate the question. The first method employed was developed from the idea that if two fine wires be placed near together, and both act as resonators to a primary oscillator, the electrodynamic attraction caused by the electric currents up and down the wires, and the electrostatic repulsion between the charges on them, might result in the relative motion of the two wires. From theoretical considerations based on the assumption that the currents are harmonic in time and space, the authors inferred that the electrodynamic effect would preponderate at the middle of the wires, whilst the electrostatic repulsion would be greatest at the ends. To cause the attractions and repulsions to conspire in producing rotation, cranked resonators, A, B, C (see figure), were made; one was fixed, and the other suspended by a quartz fibre, to turn about a middle line, DE. These were inclosed in a glass vessel, and on starting the oscillator a turning movement was observed in a direction opposite to that expected. This motion was eventually traced to the electrostatic influence of the oscillator, for although the imperfectly conducting surface of the glass acted as a perfect screen from such action when the potentials of the oscillator were varied slowly, it did not do so for changes occurring about 500 million times per second. After adopting means to avoid this disturbance, and constructing lighter resonators, the experiments were repeated, with negative results. From the dimensions of the quartz-fibre used it was estimated that a force of 158 millionths of a grain could have been detected with certainty; this would have corresponded to about $\frac{1}{300}$ of an ampere in each resonator. It is hoped that by further increasing the sensitiveness of the apparatus, and using parabolic reflectors, the effect sought for may be detected. In the second method of attacking the subject, a Joule's dynamic air-thermometer was employed. This consisted of a glass tube with a partition along the middle extending nearly to the ends. If one side of the tube be warmed, convection currents circulate, and deflect an index placed in the steam. A small mirror suspended about one edge, and counterpoised, was used for an index, and was so sensitive that it was impossible to get the air still enough by any ordinary method of screening. However, by the ingenious device of putting the thermometer within a larger tube kept rotating by clockwork, the difficulties were surmounted. A doubled wire placed in one side of the thermometer served as resonator, and on starting the oscillator a large deflection resulted. A similar deflection was caused by applying about $\frac{1}{4}$ of a volt to the ends of the wire. This proved that the effect observed by Mr. Gregory is due to heating. The least rate of heating observable with the air thermometer was found to correspond to one calorie (gramme-water-Centigrade) per 24 hours in the whole tube, or 1 calorie per centimetre of wire in 103 days. Dr. Lodge asked Sir William Thomson whether, when electric pulses travel along parallel wires with the velocity of light, any action could exist between them, for two charged spheres travelling together at that velocity exert no mutual attraction or repulsion. In reply, Sir William said he was inclined to think Mr. Boys's treatment of the subjection was in the main correct, but it was quite possible that at such velocities the ordinary laws might be modified by the fact that the time taken for the force to be propagated from wire to wire is comparable with that required for the pulse to travel the whole length of the wire. As an example of the peculiar effects of rapid discharges, he said he had seen two copper wires which had been flattened against each other by lightning. Mr. Boys thought that in his resonators a condition analogous to stationary waves would exist, for the pulses are reflected from the ends. Dr. Lodge said he had that afternoon observed the action of parallel strips when Leyden-jar discharges were passed through them. The strips gave a kick at each discharge. Mr. Gregory mentioned that, in trying to increase the sensitiveness of his meter so as to measure the variation with distance, he had found that two resonators in proximity interfered with each other. He had, however, succeeded in increasing the sensibility about five-fold. Prof. Worthington asked if it was possible to measure the energy of the oscillator, and also whether the quantity caught by the resonator could be estimated from the solid angle it subtended at the source of energy, wherever that might be. Prof. Perry considered it easier to infer the energy of the source from that received by the resonator. Dr. Lodge said the energy of the source could be easily measured. The power radiated was enormous whilst it lasted, vastly exceeding that of tropical sunshine; and, if it could be made continuous, the apparatus would soon be red-hot. The energy radiated, he said, converges on the resonators, and hence the solid angle method of estimating the amount received would be erroneous. Moreover, the source was not at the oscillator, but at a quarter wave-length from it, and most of the energy returns to the oscillator; only a small fraction is splashed off and sent into space Small oscillators radiate powerfully because the quarter wave-lengths are small; whereas the slow oscillators or alternators used commercially radiate very little of their energy. The exact law of variation of intensity of radiation with distance was rather complicated, but the theory had been completely worked out by Stokes in 1848. Mr. Blakesley thought the energy that returns to the oscillator would be available for subsequent radiations. Dr. Lodge pointed out that wires or other resonators placed within the quarter wave-length would intercept part of the returning energy.—Two communications—notes on secondary batteries, by Dr. Gladstone and Mr. Hibbert; and an easy rule for calculating approximately the self-induction of a coil, by Prof. J. Perry—were taken as read. In the first of these the authors show cause for believing that the beneficial effect produced by adding sodium sulphate to the ordinary electrolyte is due partly to its facilitating the reduction of lead sulphate and also to its power to diminish local action between the electrolyte and different parts of the lead plates. As regards the chemical actions which take place during the working of ordinary cells, they see no reason to doubt the view put forward by one of them in 1882, that the substance produced in the voltaic reaction is ordinary lead sulphate, $PbSO_4$. They also conclude that the high E.M.F. of a cell immediately after stopping the charging current is due to the inequality of acid strength near the two plates, and the gradual fall of E.M.F. is caused by the equalization of strength produced by diffusion.—Prof. Perry's rule relates to hollow cylindrical coils, and is expressed by the following formula:—



$$\text{L (in secohms)} = \frac{n^2a^2 \div 10^7}{1{\cdot}844a + 3{\cdot}1c + 3{\cdot}5b};$$

where n = number of windings,
a = mean radius of winding in centimetres,
b = axial length,
c = radial depth of winding,

and b and c are less than $\frac{a}{2}$.

The time-constant of such a coil is given in terms of the volume of copper (V′) in cubic centimetres by

$$\frac{L}{R} = \frac{V' \div 1000}{0{\cdot}728a \div 1{\cdot}33c + 1{\cdot}5b};$$

and the conditions for making this small are pointed out in the paper.—A paper by the Rev. T. Pelham Dale was postponed till next meeting.

Anthropological Institute, June 10.—Prof. Flower, C.B., F.R.S., Vice-President, in the chair.—The Chairman exhibited a "ula" or fetish brought by the Rev. L. O. Warner from the neighbourhood of Lake Nyassa.—Mr. Theodore Bent read a paper on the nomad tribes of Asia Minor. The paper referred in the first place to the heterogeneous mass of nationalities on and around the Cilician plain, but took only one point for discussion—namely, the religion of the Ausairee around Tarsus, identifying this cult with that of the Ali-ullah-hi of Northern Persia, and proving that most nomads, from the Mediterranean to the Caspian, belonged to this secret religion. The dogmas of the religion were set forth as obtained from three sources, namely: (1) account of the renegade Suleiman; (2) studies amongst the Ali-ullah-hi; (3) researches amongst the Ausairee of Tarsus.—The Rev. E. F. Wilson read a few notes on some North American Indians.—

In a paper entitled "A Contribution to a Scientific Phrenology," Mr. Bernard Hollander presented the result of further investigations into brain-functions—the first series of which has been published in the Journal of the Anthropological Institute of August 1889—showing again a striking similarity between modern experimental researches and the observations made by the founders of the phrenological doctrine. (*a*) The centre for visual perception and ideation [first occipital convolution]—considered by some physiologists to be the centre for the "concentration of attention"—corresponds with the localization of "concentrativeness," by Geo. Combe. (*b*) Mr. Herbert Spencer, who in the *Zoïst*, vols. i. and ii., published his phrenological observations, considers the area, which Dr. Gall noted to be connected with visions and hallucinations, to be the centre for the revivification of ideas, which in its unnatural actions is accompanied by a difficulty in distinguishing revived impressions from real perceptions. The localization is the same as Dr. Ferrier's centre [12], the excitation of which causes such movements of eyeballs and head as are "essential to the revivification of ideas." (*c*) Excitation of the third and fourth external convolutions in jackals and cats is accompanied by retraction of the ear, a sudden spring or bound forward, opening of the mouth with vocalization and other signs of emotional expression, such as spitting and lashing the tail as if in rage. Dr. Gall located in the same area the "carnivorous instinct," termed "destructiveness" by his followers, and considered by Prof. Bain to be merely another name for the irascible emotion. Though the investigations are by no means finished, Mr. Hollander expressed the hope that an examination of his two communications to the Institute may induce men of science to reconsider the antiquated system of phrenology, which has hitherto failed to recommend itself to the scientific world.

Geological Society, June 18.—Dr. A. Geikie, F.R.S., President, in the chair.—The following communications were read:—The Borrowdale plumbago, its mode of occurrence and probable origin, by J. Postlethwaite.—Notes on the valley-gravels about Reading, with especial reference to the Palæolithic implements found therein, by O. A. Shrubsole. The following deposits containing implements are described:—A. *North of the Thames*. (i.) Gravel at Toot's Farm, Caversham; 235 feet above sea-level. (ii.) Clayey gravel by side of Henley Road, Caversham; 168 feet above sea-level. (iii.) Subangular gravel at Shiplake; 200 feet above sea-level. B. *South of the Thames*. (i.) Gravel at Elm Lodge Estate, Reading; 197 feet above sea-level. (ii.) Gravel on disturbed beds at Redlands; 157 feet above sea-level. (iii.) Comminuted flinty gravel at Southern Hill; 223 feet above sea-level. (iv.) Gravel at Sonning Hill; 185 feet above sea-level. (v.) Gravel at Ruscombe, Twyford; 165–170 feet above sea level. The author concludes that the highest gravels (235–280 feet above sea-level) do not, so far as is known, contain any traces of man, and that a considerable amount of valley-erosion occurred before the deposition of the earliest gravels which have furnished human relics. Further, he considers that the deposits indicate the occurrence of a severe climate at an early stage, and its recurrence at a later one, viz. during the deposition of the gravels found at a height of 197 feet and 144 feet respectively above the sea-level. He believes that many of the implements found in the lower levels at Reading have been derived from gravels of various dates and different levels, which have been swept away by denudation, and that this will account for the mixed character of the types of implements. After the reading of the paper, Mr. Monckton said he had noticed great variability of the gravels around Reading, and would like to learn whether it was possible to trace the subdivisions shown in the section of the pit at Grovelands for any distance laterally. Mr. Abbott could not understand from the section displayed that the Groveland gravel belonged to the Thames system. The author maintained that the variations could, to some extent, by traced laterally. The appearance of dip towards the Kennet in the section referred to by Mr. Abbott was misleading. He did not expect contemporaneous and identical valley-gravels to be discovered on the Oxford and Berks sides of the river in the way suggested. At the point in question the levels were very different.—The next meeting of the Society will be held on Wednesday, November 12, 1890.

Royal Microscopical Society, June 18.—Mr. Frank Crisp in the chair.—Mr. Mayall mentioned, in explanation of the delay in bringing forward the report of the new objective, that, before the Committee met officially to examine the objective, it had been agreed to support the report by the production of photo-micrographs of the various objects used as tests. They were, however, disappointed to find that the visual and actinic foci were not coincident, and at the request of Prof. Abbe the objective was returned to Jena. After a lapse of several weeks, Dr. Czapski replied that he had not found any trace of a "chemical" focus non-coincident with the visual focus, and the objective was again forwarded to London. The Committee then met, and the same fractured valve of *P. angulatum* was focussed accurately and then photographed, and it appeared quite sharp in the photograph. The transit of the objective from London to Jena had somehow got rid of the "chemical" focus. Unfortunately, the slide had become seriously deteriorated, so that the critical tests which they intended to photograph could no longer be tried. They were therefore compelled to await the arrival of another slide, which Dr. Van Heurck had most kindly sent, but which the Committee had not yet been able to examine.—In the absence of Mr. Pringle, the new photo-micrographic apparatus recently made to his instructions by Messrs. Swift and Son for the Royal Veterinary College, was described by Mr. Mayall.—Mr. E. M. Nelson exhibited upon the screen two photographs of the bordered pits of pine-wood. He thought these pictures showed clearly that the pits were of the nature of clack valves, and probably served the purpose of checking the downward pressure of fluid in the vascular system. He also showed some new photographs of diatoms × 1350, including one erratic form, which he proposed calling *Craspedodiscus punchbowlii*, from its resemblance to a punch-bowl.—Mr. Mayall gave a summary of the contents of a paper, by Dr. Charles E. West, of Brooklyn, on early binocular instruments.—Mr. Dowdeswell's paper, entitled "A Contribution to the Study of Yeast: Part I., Baker's Yeast," was read. Culture-tubes, containing specimens illustrative of the subject, were handed round for inspection.—Mr. C. D. Sherborn read some portions of a paper which had been prepared by himself, conjointly with Mr. H. W. Burrows and the Rev. G. Bailey, on the Foraminifera of the Red Chalk of Norfolk, Lincolnshire, and Yorkshire.

PARIS.

Academy of Sciences, June 30.—M. Hermite in the chair.—On the partial eclipse of the sun of June 17, by M. J. Janssen (see Our Astronomical Column).—On an attempt at oyster-culture carried on in the fish-pond of the Roscoff Laboratory, by M. de Lacaze-Duthiers.—On the photographic spectrum of Sirius, by Dr. Huggins. A new group of the ultra-violet series of lines is described, extending from λ 3199 to λ 3338.—On the application to great falls, in canals, of locks with oscillating liquid columns, and on a method of utilizing the automatic oscillating tube without its being blocked when the fall is considerably increased, by M. A. de Caligny.—On the residual charge of condensers, by M. E. Bouty. The author describes some experiments made with mica condensers. Among the results obtained are: (1) That a charge absorbed between the times θ and $\theta + t$ by a condenser which does not leak is identical with the residual charge liberated between θ and $\theta + t$ by the same condenser charged during a very long time. (2) This residual or absorbed charge is proportional to the electromotive force of the charging battery.—Researches on the application of the coefficient of optical rotation to determine the nature of the compounds which are produced by the action of malic acid on neutral tungstates of soda and potash, by M. D. Gernez. The experiments show: (1) That, both with salts of soda and potash, a regular increase of negative rotation occurs with solutions of increasing strength until a maximum of $-7^\circ 7'$ is reached, when equal equivalents of the two bodies are used. (2) A diminution of the rotation with change of sign and a positive maximum of $+2^\circ 42'$ for one equivalent of acid to two equivalents of the salt. (3) A diminution of the rotation with change of sign and a negative maximum of $-2^\circ 1$ when the solution contains one equivalent of acid to three equivalents of the salt.—On the action of titanium chloride on metals, by M. Lucien Lévy.—On the decomposition of rocks and the formation of arable land, by M. A. Muntz.—The author has found nitrifying micro-organisms universally distributed, even occurring on the bare rocks of mountain peaks, and attributes to them a considerable share in the work of breaking down rock-masses into soil.—On the development of the blastoderm in the isopodous Crustacea (*Porcellio scaber*, Latr.), by M. Louis Roule.—Crystallographic and optical properties of pyroxene obtained by means of superheated water, by M. A.

Lacroix. The conclusion is drawn that all its properties are sufficiently characteristic to identify artificial pyroxene with that of volcanic rocks.—The identity of composition of some sedimentary phosphates with apatite, by M. Henri Lasne. Phosphates from various sources and of different geological ages have been found to consist essentially of calcium fluophosphate of the same percentage composition as apatite, together with varying amounts of clay, calcium sulphate, &c.—On the reproduction of sillimanite and the mineralogical composition of porcelain, by M. W. Vernadsky. Kyanite and andalusite are transformed into sillimanite when raised to a white heat; the same mineral, or some body very like it, is shown by the author to be produced on heating together an intimate mixture of dry SiO_2 and dry Al_2O_3. He further proves that the products of decomposition by heat of topaz, dumortierite, and kaolin are composed in great part of the same substance, and that the crystalline portion of porcelain consists also of this mineral.—On the fauna of pyritic Ammonites of Djebel-Ouach, province of Constantine, by M. G. Sayn.—Craniectomy on a microcephalous subject, by M. Lannelongue. A remarkable operation on a female, aged four years, is described, resulting in a considerable amelioration of the condition of the patient.—On a new system of representing geographical relief, by M. Eugène Guillemin.

BERLIN.

Physical Society, June 13.—Prof. Du Bois-Reymond, President, in the chair.—At the opening of the meeting, Prof. Schwalbe referred in the warmest terms to the loss the Society had sustained by the death of Director F. Gallenkamp, who had for many years acted as its Librarian.—Prof. Vogel spoke on photography in natural colours as attempted at first by Seebeck, then in succession by Becquerel, Niepce, St. Victor, Poitevin, Zenker, and most recently by a Hungarian named Verres. He exhibited a series of photographs in colours obtained by Verres, which, however, showed conclusively that he has not solved the problem, since, although the reds appear as red in the photographs, so also do the yellows and greens appear as red, and the blues as an undeterminate colour. These photographs, on the other hand, mark a distinct advance in colour-photography, since they are fixed, while those of Zenker, although more strikingly coloured, were not fixed. The speaker criticized Zenker's views on the mode of formation of a coloured photograph, and expressed his disbelief in the possibility of any *one* substance being so changed by rays of different wave-length as to emit, from various parts of itself, rays of exactly corresponding wave-length.—Prof. Kundt exhibited a spiral of bismuth, as employed by Dr. Lenand to demonstrate the influence of a magnetic field upon the electrical conductivity of this metal; he further showed by experiment how considerable this influence is, and pointed out that it provides a means of measuring the intensity of the field.—Prof. Lampe explained that some years ago he had announced to the Society that a problem on maximal attraction of a point dealt with by Gauss had been previously propounded and treated by Playfair. More recently he had found that even Playfair was not the first to deal with this problem, but that a partial solution had been obtained by De Saint Jacques in 1750.

Physiological Society, June 20.—Prof. Du Bois-Reymond, President, in the chair.—Dr. I. Munk gave a *résumé* of the present state of knowledge as to the absorption of fat. The fact that fats with a high melting-point, such as stearin, are not absorbed is usually adduced in support of the supposed importance of emulsification; on the other hand, some of the speaker's own experiments had shown that a small amount (5–7 per cent.) of this fat may be absorbed. In support of the saponification of fats he described some recent experiments made on the patient with a lymphatic fistula (NATURE, vol. xli. p. 504) and on dogs. Thus, for instance, when spermaceti was administered to the patient after prolonged fasting, the lymph became cloudy and milky in the third or fourth hour of digestion. Analysis of the whole lymph secreted during thirteen hours showed that 15 per cent. of the spermaceti had passed into the lymph, not, however, in an unchanged condition, but as palmitin, showing that the spermaceti must have been decomposed in the alimentary canal, and that the palmitic acid of which it is partly composed must have become united with glycerin. He made further experiments with oleate of amyl-alcohol, hoping to verify the decomposition of this fat by observing that the animal exhibited symptoms of poisoning with amyl-alcohol: this was, in fact, observed. The above compound could not, owing to its pungent taste, be given in sufficiently large doses to the patient with the lymphatic fistula to be conclusive; but an analysis of the lymph secreted from the fourth to the twelfth hours showed that it contained, not the compound of oleic acid and amyl-alcohol, but olein—a further proof of its decomposition before absorption. So many difficulties stand in the way of the view that all fats are saponified before absorption, that the speaker considered the various points in connection with the process of fat absorption as still undetermined.—Prof. Ewald gave an account of the sudden death of a patient following upon the introduction of a flexible gastric sound; a subsequent *post-mortem* showed that the cause of death was rupture of an aortic aneurism. He then proposed as a subject for discussion the question as to whether the rise of blood-pressure which led to the rupture was due to the slight abdominal pressure or to some psychic excitation. The majority of those who joined in the discussion regarded the former as the causative factor of the rise of aortic blood-pressure.

BRUSSELS.

Royal Academy of Sciences, May 6.—M. Stas in the chair.—The following communications were presented:—On the conditions of the act of chemical combination; modifications arising from the presence of inactive dissolvents; extract of a letter from M. Menschutkin, Professor of Chemistry at St. Petersburg, to M. Louis Henry. Prof. Menschutkin has studied the combination of $(C_2H_5)_5N$ with C_2H_5I in the presence of inactive dissolvents, for example, hydrocarbons, simple ethers, ketones, &c. The experiments show that such substances exercise a considerable influence on the velocity of combination, it being found that if 1 represents the constant of velocity of the reaction noted above in hexane, C_6H_{14}, this constant for the same combination in $CH_3—CO—C_6H_5$, all other things being equal, is 847·7.—The state of vegetation on March 21 and April 21, 1890, in Gembloux, Huccorgne, Liége, and Spa, by Prof. G. Dewalque. The observations that have been obtained of herbaceous plants are very discordant. It is estimated, however, that vegetation was from 6 to 8 days behind on March 21, and 4 or 5 days behind on April 21.—On the characteristic points of some remarkable lines in conics, by C. Servais.—On the curvature in curves of the second degree, by the same author.—Note on the development in series of sine, cosine, and exponential functions, by Prof. Alphonse Demoulin.

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