Rivista Scientifico-Industriale, March 31.—Influence of magnetism on the electric resistance of solid conductors, by Dr. Faè. In this paper the author explains the conclusions already announced for cobalt and antimony, and describes his further researches on other bodies in connection with the influence of magnetism on their electric resistance. He concludes generally that the resistance of the principal solid conductors undergoes modifications in the magnetic field, such modifications being perceptible enough in the highly magnetic or diamagnetic metals, but most conspicuous in bismuth. In all other metals it is very slight, and at times quite inappreciable. Under like conditions the resistance in the direction of the lines of force increases both for the magnetic and diamagnetic metals, while in the direction normal to the lines of force it diminishes in the first and increases in the second, although under special conditions iron and steel behave exceptionally. These variations of resistance make it probable that Hall's phenomenon depends in effect on a transitory change produced by the magnetism in the structure of the metals, and causing a rotatory variation in the electric resistance.—Dr. Luigi Fritsch describes an industrial product of the nitrate of ethyl.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 2.—"On the Voltaic Circles producible by the mutual Neutralization of Acid and Alkaline Fluids, and on various related Forms of Electromotors." By C. R. Alder Wright, D.Sc., F.R.S., Lecturer on Chemistry and Physics, and C. Thompson, F.I.C., F.C.S., Demonstrator of Chemistry in St. Mary's Hospital Medical School.

About the beginning of the present century it was noticed that when platinum plates are immersed respectively in an acid and an alkaline fluid (*e.g.* diluted sulphuric acid and caustic potash solution), and connected with a galvanometer, a much stronger current flows at first than after passing awhile: which circumstance may be explained by supposing that in virtue of the chemical action taking place between the two fluids a current is generated, the flowing of which necessarily causes electrolysis of the liquids, so that the plates become "polarized" by the evolution thereon of hydrogen and oxygen respectively, whereby an inverse E.M.F. is set up, gas battery fashion. It was shown subsequently by Becquerel that when *nitric* acid is thus used in conjunction with caustic potash a much more powerful continuous current can be generated, the passage of which is accompanied by a continuous evolution of oxygen from the plate immersed in the alkali, whilst the nitric acid is simultaneously reduced, forming lower oxides of nitrogen: whence the term "pile à oxygène" applied to the combination. In this arrangement the hydrogen supposed to be formed electrolytically can never actually make its appearance in the free state, being oxidized whilst nascent by the nitric acid; so that as the gas battery inverse E.M.F. is not developed, the continuous current passing is not so much weakened; the oxygen set free by electrolysis consequently passes off continuously at the other plate.

It occurred to the authors that, if this reasoning be correct, firstly, other oxidizing acid liquids besides nitric acid should be able to act in the same way, causing continuous oxygen evolution at the plate immersed in the alkali. Secondly, by parity of reasoning, if ordinary dilute sulphuric acid be used on the one side opposed to an alkaline fluid also containing some readily oxidizable substance dissolved therein, continuous *hydrogen* evolution should, under favourable circumstances, be produced at the plate in the acid, the oxygen evolved at the other plate being acted upon while nascent by the oxidizable substance present, so as to be suppressed just as the hydrogen is in Becquerel's "pile à oxygène." Thirdly, whether oxygen or hydrogen be continuously evolved, the quantity liberated should be proportionate to the current passing; so that, if a silver voltameter be included in the circuit, for every milligramme-equivalent (108 mgrms.) of silver deposited 1 mgrm.-equivalent of gas should be liberated; *i.e.* 8 mgrms. of hydrogen occupying at 0° and 760 mm. 5·6 c.c.; or 1 mgrm. of hydrogen occupying 11·2 c.c.

A number of cells were arranged, consisting of two porcelain basins or beakers, one containing the acid and the other the alkaline fluid united by a siphon tube, or by a thick wick, containing or wetted with a strong solution of the salt formed by the union of the acid and alkali (*e.g.* sulphate of soda when sulphuric acid and caustic soda were used, and so on). A plate of platinum foil was placed in each fluid attached to a platinum wire, and arranged under an inverted graduated tube filled with the liquid pertaining to that side of the cell, so that any evolved gas could be collected and measured, loss of gas from evolution at the surface of the wire outside the tube being avoided by coating the wire with gutta percha or paraffin wax. A small silver voltameter with a gold plate as negative electrode was always included in the circuit, so as to permit of the deposited silver being determined. Numerous experiments thus made are described, the results of which were always in sensible accordance with the above previsions, a considerable variety of acid oxidizing fluids and alkaline oxidizable solutions being employed.

These results render it probable that, if, instead of a platinum plate and an oxidizable substance in solution, there be used simple caustic soda or ammonia, and an oxidizable metal, the oxide of which is soluble in the alkaline fluid, continuous currents might be set up (in certain cases at least), even though the metal used have of itself no visible action on the alkaline fluid, apart from its absorbing oxygen dissolved therein or in contact therewith; for instance, metallic tin or lead in contact with caustic soda, or copper immersed in ammonia solution. On trying such experiments, continuous evolution of hydrogen from the surface of the platinum plate immersed in the acid was found in many instances to be readily brought about, the amount evolved being (as might *a priori* be anticipated) proportionate to the current passing, *i.e.* to the quantity of silver deposited in a silver voltameter included in the circuit. By employing an alkaline solution of potassium cyanide, it was found easy to produce the same result when certain metals of the non-oxidizable class (gold, silver, palladium, and mercury, but *not* platinum) were used instead of really oxidizable ones.

In most cases the quantity of metal taken into solution in the alkaline fluid was practically identical with that equivalent to the current passing, calculated on the assumption that the nascent oxygen due to the electrolysis combined with the metal *to form the lowest oxide* thereof, in the various cases respectively. In some few instances a slight excess of metal was dissolved, obviously due either to local action or the effect of small quantities of dissolved air. Two well-marked exceptions to the general rule, however, were noticed: one was *tin*, which when dissolved in caustic soda invariably went into solution to an appreciably less extent than corresponded with SnO; instead of fifty-nine parts of tin being dissolved for every 108 of silver deposited in the volameter, only quantities amounting to 93 to 97 per cent. of that amount were dissolved, indicating that some little quantity of SnO_2 was formed as well as SnO, although the latter largely predominated. The other exception was *mercury*, which in contact with potassium cyanide dissolved to only half the extent due to formation of Hg_2O, *mercuric* potassio-cyanide being produced. Copper, whether in contact with ammonia or with potassium cyanide, on the other hand, always dissolved in proportions corresponding with Cu_2O, a little excess instead of deficiency being usually noticeable through the secondary action of dissolved air.

In all these experiments, the results obtained are precisely those due to electrolysis of the salt formed by the neutralization of the acid and alkali in accordance with the scheme (for sulphuric acid and soda)—

$$\left\{\begin{array}{l} H_2SO_4 \mid Na_2SO_4 \mid Na_2SO_4 \mid 2NaOH \\ H_2 \mid SO_4Na_2 \mid SO_4Na_2 \mid SO_4Na_2 \mid H_2O + O \end{array}\right.;$$

where either the hydrogen or the oxygen is suppressed, whilst nascent, by combination with the fluid in contact with which it is evolved, or with the metal in the case of oxygen in the cells last described.

Accordingly it might be expected that in all actions of this kind a quantity of acid on the one hand, and of alkali on the other, proportionate to the current passing, will disappear as such on account of the mutual neutralization thus indirectly brought about. The authors have made a number of titration experiments with a view to obtaining numerical evidence on this point, with the general result of finding that such neutralization always takes place. It may be noticed that if cells be constructed with platinum electrodes immersed respectively in an alkaline fluid containing an oxidizable substance dissolved therein, and an acid fluid containing an oxidizing agent (*e.g.* caustic soda solution of pyrogallol, and sulphuric acid solution of chromic anhydride), continuous currents of very considerable power may be obtained when the internal resistance is diminished sufficiently by using cells of considerable magnitude; *e.g.* when made of

the stoneware and inner porous vessels usually employed for Grove's cells, the porous vessel being cemented into the outer stoneware vessel (by paraffin wax or other unattacked material) in such a fashion as to divide it into three compartments separated one from the other by porous dividing walls; the acid and alkaline fluids being placed in the two outermost compartments, and the innermost one being filled with a solution of a neutral salt, *e.g.* sodium sulphate.

March 1.—"On Electrical Excitation of the Occipital Lobe and adjacent Parts of the Monkey's Brain." By E. A. Schäfer, F.R.S., Jodrell Professor of Physiology in University College, London.

The following are the results of my own observations:—Electrical excitation of the posterior limb of the angular gyrus, of the upper end of the middle temporal gyrus[1] (which is continuous with it), of the whole cortex of the occipital lobe, inclusive of its mesial and under aspects and of the quadrate lobule, causes conjugate deviation of the eyes to the opposite side. The movement is not, however, in all cases a simple lateral deviation, but the lateral movement may be combined with an upward or downward inclination according to the part stimulated. Thus—

(1) Excitation of a superior zone which comprises on the external surface the posterior limb of the angular gyrus, the upper (posterior) end of the middle temporal gyrus, and the part of the occipital lobe immediately behind the external parieto-occipital fissure and on the mesial surface the quadrate lobule immediately in front of the upper end of the internal parieto-occipital fissure and the occipital lobe for a short distance behind the upper end of that fissure, produces, besides the lateral deviation, a downward inclination of the visual axes which is sometimes—especially when the stimulation is applied at or near the mesial surface—so marked as greatly to obscure the lateral deviation.

(2) Excitation of an inferior zone comprising the whole of the inferior surface of the lobe, the lower part of the mesial surface, and the posterior or lowermost part of the convex or external surface, produces, besides the lateral deviation, an upward inclination of the visual axes, which, like the downward movement resulting from stimulation of the superior zone, may be so marked as partly to obscure the lateral deviation.

(3) Excitation of an intermediate zone which comprises the greater part of the external surface (where it gradually broadens out laterally) and extends over the margin of the great longitudinal fissure to include a narrow portion of the mesial surface, produces neither upward nor downward inclination of the visual axes, but a simple lateral movement.

If, as is highly probable, the movements of the eyes, which occur on excitation of the occipital lobe and adjacent parts, are the result of the production of subjective visual sensations, these effects of excitation of the several parts of that lobe and the adjoining portions of the brain would appear to indicate—

1. A connection of the whole visual area of each hemisphere with the corresponding lateral half of each retina. (This has already been ascertained to be the case from the result of removing the whole of the area on one side, bilateral homonymous hemianopsia being thereby produced.)

(2) A connection of the superior zone with the superior part of the corresponding lateral half of each retina.

(3) A connection of the inferior zone with the inferior part of the corresponding lateral half of each retina.

(4) A connection of the intermediate zone with the middle part of the corresponding lateral half of each retina.

"A Comparison of the Latency Periods of the Ocular Muscles on Excitation of the Frontal and Occipito-Temporal Regions of the Brain." By E. A. Schäfer, F.R.S., Jodrell Professor of Physiology in University College, London.

Conjugate deviation of the eyes to the opposite side is produced by excitation of entirely different regions of the cerebral cortex.

Of these parts, excitation of which produces this result (conjugate deviation of the eyes to the opposite side), one, viz. the frontal area, is distinguished from the rest by the fact that its removal produces paralysis of that movement. This fact has been seized upon by Ferrier as indicating an important functional difference, the movements in the one case being probably caused by the direct action of this part of the cortex upon the centre of origin of the nerves to the ocular muscles; but in all other cases by indirect action, the movement when, *e.g.*, the visual or auditory region is stimulated being the result of visual or auditory impressions (subjective sensations) being provoked in the brain by the excitation, and these impressions producing indirectly the action in question. Others have supported the view that in all cases the movement is the result of the setting up of subjective sensations, but that in the case of the frontal area these are tactile or are connected with the muscular sense.

It seemed to me that light would be thrown upon the question if the period of latent stimulation of the ocular muscles were accurately determined under exactly the same conditions for the frontal and posterior (temporal and occipital) areas respectively. The result of this determination, which I have made in a number of monkeys, is to show that the latent period is longer by some hundredths of a second in the case of stimulation of the occipital lobe, or of the superior temporal gyrus than when the frontal area is stimulated; thus indicating that in the former case the nervous impulses must be transmitted through at least one more nerve centre than in the latter.

[1] Excitation of the upper end of the superior temporal gyrus gives a similar result. Since this is commonly accompanied by a movement of the opposite ear, it is usually considered that subjective auditory sensations have been called up by the excitation.

Geological Society, March 28.—Dr. W. T. Blanford, F.R.S., President, in the chair.—The following communications were read:—On some eroded agate pebbles from the Soudan, by Prof. V. Ball, F.R.S. The majority of the pebbles in a collection made by Surgeon-Major Greene in the Soudan, and presented by him to the Science and Art Museum in Dublin, are of very similar character to the agate and jasper pebbles derived from the basalts of India. It may be concluded inferentially that they came originally from a region in which basaltic rocks occur to a considerable extent. A certain number of them are eroded in a manner unlike anything noticed in India, though it is probable that similar eroded pebbles will eventually be found there. Throughout India, wherever there is a deficient subsoil-drainage or excessive evaporation and limited rainfall, salts are apparent either in supersaturated subsoil-solutions or as crystallizations in the soil. They are most abundant in basaltic regions, and in a lake occupying a hollow in the basalt in Berar carbonate of soda is deposited in abundance from the water, which becomes supersaturated during the summer. The author commented on the efficacy of such a liquid as a solvent of silica, and noticed the selective action of the agent which had affected the Soudan pebbles and had corroded some layers more than others; he suggested that, while this might be to some extent due to differences in composition, it was more probably owing to differences of nodular constitution. He considered it unnecessary to refer to the action of humic acid, because, while the salt to which the solvent action is attributed would be capable of doing such work, and would be probably abundant in the region referred to, we could not expect any great amount of humic acid in the same area. This paper gave rise to a discussion, in the course of which remarks were made by the President, Mr. Whitaker, Mr. Irving, Mr. De Rance, and Sir Warington Smith.—On the probable mode of transport of the fragments of granite and other rocks which are found embedded in the Carboniferous Limestone of the neighbourhood of Dublin, by Prof. V. Ball, F.R.S.—The Upper Eocene, comprising the Barton and Upper Bagshot formations, by J. Starkie Gardner and Henry Keeping, with an appendix by H. W. Monckton.

Royal Microscopical Society, March 14.—Dr. R. Braithwaite, Vice-President, in the chair.—The Rev. A. H. Cooke exhibited a number of photomicrographs of the odontophores of Mollusca, as an attempt to illustrate this group of objects by photography; he also referred to the valuable results obtained in the definition of species by the application of the method.—Mr. E. M. Nelson exhibited and described a new form of mechanical stage, in which two points were moved by milled heads in rectangular directions, carrying the slide with them, the slide being pressed against them, when they were withdrawn, by the hand.—Mr. C. L. Curties exhibited a new combination condenser, which, in addition to the condenser, also contained an iris diaphragm, a spot lens, and a polarizing prism.—Mr. Crisp exhibited a Collins's aquarium microscope which could be fixed by suction to the glass side of the tank; also Klonne and Müller's aquarium microscope for examining objects in a small aquarium or trough specially constructed for the purpose, and fitted with movable diaphragm slides; also a new form of Thury's 5-tube microscope for class purposes, having a reflecting prism made to rotate, so as to exhibit the object upon the stage alternately to

each of five observers.—Mr. G. Massee read a paper on the type of a new order of Fungi, Matuleæ.—Mr. J. Rattray gave a *résumé* of his paper, "A Monograph of the genus *Aulacodiscus*," the subject being illustrated by diagrams, and by a tabulated list of groups of allied species.—The Chairman announced that the date of the next *conversazione* had been fixed for April 25.

Entomological Society, April 4.—Dr. D. Sharp, President, in the chair.—Mr. H. Goss exhibited a large number of insects lately received from Baron Ferdinand von Mueller, F.R.S., of Melbourne, which had been collected by Mr. Sayer on Mount Obree, and the adjoining ranges in New Guinea, during Mr. Cuthbertson's recent expedition there under the direction of the Royal Geographical Society of Australia. The collection comprised Coleoptera, Lepidoptera, Hemiptera, Diptera, Hymenoptera, and Orthoptera. The Lepidoptera included twenty species of butterflies belonging to the genera *Calliplæa*, *Chanapa*, *Hamadryas*, *Melanitis*, *Mycalesis*, *Hypocysta*, *Tenaris*, *Hypolimnas*, *Cyrestis*, *Neptis*, *Acræa*, *Danis*, *Pithicops*, *Appias*, *Ornithoptera*, and *Eurycus*.—Mr. Osbert Salvin, F.R.S., exhibited, and made remarks on, about sixty specimens—no two of which were alike—of a species of butterfly belonging to the genus *Hypolimnas*, all of which had been caught by Mr. Woodford near Suva, Fiji, on one patch of Zinnias.—Mr. H. T. Stainton, F.R.S., exhibited, on behalf of Mr. G. C. Bignell, cases of *Thyridopteryx ephemeræformis*, collected near Charleston, U.S.A. Mr. Stainton said he hoped Mr. Bignell would not introduce this pest into England.—Mr. W. F. Kirby exhibited, and read notes on, about twenty species of South African dragon-flies lately received from Mr. Roland Trimen, F.R.S., of Cape Town. The collection included some new species.—Mr. Goss read a letter from Mr. Bignell, correcting a statement made by Mr. Poulton at the March meeting of the Society, to the effect that the variety *Valezina* of the female of *Argynnis paphia* did not occur in Devonshire. Mr. Bignell said that the variety *Valezina* was included in Mr. Reading's "Catalogue of Devonshire Lepidoptera"; and he had himself taken specimens of this variety in Bickleigh Vale, Devon.—Mr. Waterhouse read a paper entitled "Additional Observations on the Tea-bugs (*Helopeltis*) of Java," and exhibited a number of specimens of these insects. He said that the species infesting the Cinchona in Java was supposed to have been introduced from Ceylon in tea, but that he had discovered that the species on the tea and on Cinchona in Java were distinct, and that both species were distinct from *Helopeltis antonii* of Ceylon.—Herr Jacoby read a paper entitled "New, or little-known, species of Phytophagous Coleoptera from Africa and Madagascar."—A letter was read from Mr. E. C. Cotes, of the Indian Museum, Calcutta, asking for the assistance of British entomologists in working out certain groups of Coleoptera, Neuroptera, Orthoptera, Diptera, and Hymenoptera in the Indian Museum. A discussion ensued, in which Mr. McLachlan, F.R.S., Dr. Sharp, Mr. Waterhouse, Herr Jacoby, and Mr. Distant took part.

PARIS.

Academy of Sciences, April 3.—M. Janssen, President, in the chair.—A new theory of the equatorial *coudé* and of equatorials in general (continued), by MM. Lœwy and P. Puiseux. In the present paper the authors deal with the new processes for determining the position of the polar axis, concluding with some remarks on the bend of the arm. Six distinct methods are given for determining the constant n, and five for λ.—Results of comparisons of the standard Peruvian unit of measure and the international metre made by M. Benoit, presented by M. Wolf. From these comparisons, which have been made at the International Bureau of Weights and Measures, it appears that the Peruvian standard is substantially in the same condition as when it was constructed by Langlois in 1735. But it is also made evident that the Peruvian arc, measured with this standard, has been hitherto incorrectly compared with the other terrestrial arcs. In fact it is somewhat shorter than was supposed, and in a future paper the author will point out the consequences to be drawn from this error as affecting the form of the globe.—On the relations of atmospheric nitrogen with vegetable soil, by M. Th. Schlœsing. The author here deals with an objection that might be raised against the results of his previous experiments. The objection is based on the consideration that vegetable humus, like all dead organic matter, is a prey to two different kinds of microbes, one working in the absence, the other in the presence, of oxygen. But the conclusions previously arrived at do not appear to be materially affected by this circumstance.—On the blizzard of March 11 and 12 in the United States, by M. H. Faye. Comparing the public reports with the remarks of Dr. G. Hinrichs, Director of the Iowa Weather Service, the author concludes that a blizzard is a local snowstorm accompanied by an extremely sudden fall of temperature, and controlled by a general cyclonic movement passing over regions subject to great extremes of climate. The phenomenon is analogous to such atmospheric disturbances as the Russian *bora* or *buran*, the *khamsin* or sandstorms of the Sahara, the *föhn* of the Alps, all of which are modified by the different local conditions.—Remarks accompanying the presentation of a work on the Elasmotherium, by M. Albert Gaudry. From the specimens obtained from Russia a more correct idea can now be formed of this huge pachyderm than was hitherto possible. It flourished in the Quaternary epoch, and, notwithstanding several aberrant features, appears on the whole to have somewhat closely resembled the rhinoceros. Surviving till the close of the Glacial period, it became gradually modified, like the elephants and ruminants, to the altered climatic conditions, under which a subtropical vegetation was replaced by herbaceous plants.—On a disposition, by means of which powerful objectives may be employed in meridian observations, by M. G. Bigourdan. By the arrangement here described the great meridian instruments, such as those of Greenwich and Paris, which at present can scarcely observe stars beyond the twelfth magnitude, may be placed on a level with the equatorials.—Observations of the Sawerthal Comet made at the Observatory of Nice with the 0·38 m. Gautier equatorial, by M. Charlois. These observations, covering the period from March 14 to March 21, give the right ascension, polar distance, and other data for the comet and three comparison-stars.—On the velocity of sound, by MM. J. Violle and Th. Vautier. From the experiments here described it is placed beyond doubt that the velocity of the sound-wave diminishes with its intensity; also that the pitch of the sound has no influence whatever on the velocity of its propagation. The slight differences observed appear to be due solely to the different intensities of the sound-wave in the respective cases.—Photographic experiments on the penetration of light in the waters of the Lake of Geneva, by M. F. A. Forel. Comparing his present researches with those of previous years, the author finds that for the chloride of silver the limits of absolute darkness range from 45 metres in July to 110 in March; that the variations in these limits run parallel with those of the limits of visibility; and that the water of the lake is much more limpid in winter than in summer, the difference being mainly due to the greater abundance of organic matter held in suspension during the latter season.—On the latent heats of vaporization for some extremely volatile substances, by M. James Chappuis. The author points out that his own previously announced conclusions have been substantially confirmed by those recently announced by MM. Cailletet and Mathias.—On the laws of chemical equilibrium, by M. H. Le Chatelier. In connection with the discussion on the theory of the thermodynamic potentials, the author here shows how, starting with the hypothesis of MM. Gibbs and Duhem, and employing the same methods, the general formula indicated by M. Van t' Hoff may be established in an extremely simple way.—On the active crystallized matter of the poisoned arrows used by the Somali people, by M. Arnaud. This is an extract from the Wabaio plant, a species of *Carissa*, the poisonous extract from which (wabain) is shown by analysis to be a compound of carbon, hydrogen, barium, and oxygen, with the formula $C_{30}H_{46}O_{12}$.—On the adulteration of olive oils, by M. R. Brullé. A mixture of ordinary nitric acid and the albumen of jerked beef is shown to be an excellent chemical reagent for rapidly detecting the presence of one or more vegetable oils in the olive-oil of commerce.—On a simple and practical method of detecting and analyzing the impurities contained in the alcohols of commerce, by M. L. Godefroy. The reaction here described is extremely sensitive and accurate, detecting a millionth part, or 1 c.c. of impurities in 1000 litres of alcohol.—M. Eugène Dupuy describes some interesting experiments on dogs, cats, and rabbits, in connection with the motor functions of the brain. The results seem to be at variance with the theory usually advanced to explain the mode of production of movements or paralysis originating in the brain.

Astronomical Society, March 7.—M. Flammarion, President, in the chair.—M. Valderrama sent a drawing of a sunspot with white spots in its interior on January 15. M. Schmoll showed a drawing of the same on January 14. According to M.

Trouvelot, this appearance may be explained by a bridge crossing the spot, and sufficiently thin in some parts to escape detection.—MM. Giovannozzi, at Florence, and Bruquière, at Marseilles, sent some observations on the zodiacal light, which has been very bright; M. Gourdet, observations on 66 Ceti; and M. Guiot on Mira Ceti and ν Leporis.—M. Dumenil, at Yebleron, observed a meteor on February 19 whose trace remained visible for five or six minutes.—Observation of a fine meteor at Paris on February 24 by M. Mabire at 7 p.m.—M. de la Fresnaye submitted a plan of binocular telescope with total reflecting prisms to bring the two oculars within convenient distance for the two eyes.—M. Armelin, writing upon the calendar reform, said that it was perhaps entering on a practical phase.—The meeting thanked Mr. Holmes for his letter published in the *English Mechanic*. His observation of the *comes* to Polaris with a 1½-inch is thought remarkable.—M. Flammarion read a paper on a probable connection between the movements of our sun and those of α Centauri.—General Parmentier, reading a paper on the asteroids, remarked that the new planets discovered do not fill up the gaps to which he formerly called attention.—Various communications: on the lunar eclipse of January 28, by M. Moussette; a drawing of Plato, by M. Schmoll; observations on the aurora borealis, by M. Trouvelot; on a natural classification of double and multiple stars, by M. Flammarion; Vogel's chart of stellar spectra, presented by M. Secretan.

BERLIN.

Physical Society, March 16.—Prof. von Helmholtz, President, in the chair.—Doctor Koepsel demonstrated two energymeters constructed on different principles by Messrs. Siemens and Halske, and explained the arrangements of the same.—Prof. Lampe spoke on a deficiency in elementary text-books of mechanics—namely, that they do not employ the elliptic functions so fully treated of by Gauss and Schellbach. The speaker then showed by a series of examples how easy it is to solve a number of mechanical problems by the use of these functions.—Prof. Helmholtz next showed how the nature of elliptic functions can be made clear to persons unacquainted with them by means of the movement of a pendulum.—He then briefly communicated the results of an investigation by Prof. Töpler, of Dresden, which he had yesterday laid before the Academy of Sciences: it contains a new method for the measurement of the magnetism and diamagnetism of gases. An index drop of petroleum is placed in a glass tube bent at a very obtuse angle; on one side of the index is the gas which is to be investigated and on the other side is atmospheric air. When placed between the poles of a powerful electro-magnet, the index is moved according as the gas is more or less strongly attracted than the air: the amount of displacement is measured by a microscope. The delicacy of the method is extremely great. It was in this way observed that oxygen is most magnetic, then come air and nitric oxide; nitrogen, hydrogen, carbonic oxide, carbonic acid gas, and nitrous oxide, on the other hand, are diamagnetic. The method employed in the above research can also be applied to the solution of various other problems, as, for instance, the determination of the pressure of small columns of gases.

Physiological Society, March 23.—Prof. Munk, President, in the chair.—Dr. Benda spoke on the structure of ganglion-cells, demonstrating at the same time, by means of specimens, his method of hardening the brain and spinal cord, which consists in treating them with nitric acid and potassium chromate. His further communication dealt with certain differences, now largely reconciled, in the results obtained by the speaker and by Prof. Flesch, of Bern, who was present at the meeting. The two observers now agree that certain ganglion-cells readily take up colouring-matter, while others do not, and to these Prof. Flesch attributes a difference in physiological function. Both observers further admit the existence of dark granulations in the protoplasm of the cells, but opinions differ as to the significance of the same.—Dr. Claude du Bois Reymond stated that he had long ago planned an investigation of the pupil when in darkness, and that this intention had only become realizable since the introduction of instantaneous photography by means of the momentary illumination produced by magnesium. Miethe, the discoverer of the method of momentary illumination with magnesium, has in this way taken a photograph of his own pupil after it had been exposed to complete darkness for forty minutes. As shown by the two photographs which were exhibited the result was most surprising: the diameter of the pupil was 9 to 10 mm., while the iris was at the same time reduced to a width of 1½ to 2 mm.—Prof. Gad gave an account of experiments which had been made by Sawyer, at his suggestion, with a view to determining whether the separation of irritability and conducting power, which is so often observed by neuropathologists, has any real physiological existence. When a part of the sciatic nerve, in accordance with Grünhagen's method, was exposed for some time to the action of a current of carbonic acid gas, it was found to be capable of conveying impulses generated by stimuli applied to parts of the nerve more centrally situated, but was itself insensitive to electrical stimulation applied directly to it, as Grünhagen had already found. When that part of the nerve inclosed in the chamber was exposed to the action of diluted vapour of alcohol, the result was exactly the opposite, the conducting power being lost but the irritability retained.—Prof. Gad demonstrated on prepared skulls and on living animals, the curious and scarcely known movements of chewing which may be observed in rats. The incisors of the lower jaw are capable of lateral movement in two halves united together by ligaments, and the larger part of the work done in gnawing is carried on by means of the scissor-like movement of the two incisors. The above has recently been very fully brought to notice by Künstler.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Reports of Geological Explorations during 1885-86-87 (New Zealand).—Systéme Silurien du Centre de la Bohême, vol. vii. Part 1, Cystidées: J. Barrande (Prague).—Watt's Dictionary of Chemistry, vol. i.: Morley and Muir (Longmans).—A Treatise on Electricity and Magnetism. vol. ii.: Mascart and Joubert, translated (De La Rue).—Elementary Chemistry: W. S. Furneaux (Longmans).—Natural Laws and Gospel Teachings: Rev. H. W. Morris (R.T.S.).—Early Prose and Poetical Works of Taylor, the Water Poet (Hamilton).—Noctes Ambrosianæ: Prof. J. Wilson (Hamilton).—First Lessons in Geometry, 2nd edition: B. H. Rau (Madras).—Abhandlungen der k. b. Gesellschaft der Wissenschaften Math. Naturw. Classe, vii. Folge, 1 Band (Prag).—Perforated Stones from California: H. W. Henshaw (Washington).—Work in Mound Exploration of the Bureau of Ethnology: C. Thomas (Washington).—Education in Bavaria: Sir P. Magnus (New York).

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