the existence of nitrogen in the star can hardly be said to be proved.

Bright bands, possibly related to two found in gaseous nebulæ, were seen in the January spectra of the nova, and a spectrogram taken on March 30 shows that the nova had then arrived at the nebula stage; bands at or near λλ 4861, 4959, 5007, 5752±, and 6563 were recorded.

THE RADIAL VELOCITY OF α CYGNI.—The study of thirteen spectrograms taken at the Pulkowa Observatory confirms the variability of the radial velocity of α Cygni, first discovered at the Yerkes and Lick observatories in 1910. In No. 38 of the *Mitteilungen der Nikolai-Hauptsternwarte zu Pulkowo* Herr G. Neuimin publishes the data and results he obtained from the measures, and directs special attention to the fact that the velocities deduced from eighteen metallic lines vary considerably and consistently from those obtained from the measures of the three hydrogen lines Hδ, Hγ, and Hβ. The range of velocities, relative to the sun, as derived from the metallic lines, is from −17·6 to +2·47 km., and from the hydrogen lines −21·1 to +5·5 km.; the mean difference between the two sets of velocities, from seven plates on which both sets were measured, is +9·1±1·21 km. per sec.

Prof. Belopolsky confirmed this result by independent reductions, using seven iron, two each calcium and magnesium, one helium, and four hydrogen lines. Apparently the helium line agrees with the hydrogen lines in differing consistently from the lines of the various metals; the results show a mean difference, metallic−hydrogen, of +7·1±0·9 km. On two of the spectrograms the calcium lines H and K are apparently double.

THE DISTRIBUTION OF VARIABLE STARS.—Plotting the positions of 678 variable stars given in the *Annuaire du Bureau des Longitudes* (1909), M. Anestin, of Bucharest, finds the known agglomeration in the Milky Way and the condensations in Aquila, Lyra, Cygnus, Sagitta, Cepheus, and Cassiopeia. Near the N. pole of the galaxy, between 10h. and 12h. R.A. and +20° to +40° declination, there is but one variable as compared with twenty in a fourth the area in Aquila and Lyra. Long-period variables show a tendency to grouping, but the irregular variables are more evenly distributed except for an agglomeration in Cygnus.

In the southern hemisphere, 664 variables crowd towards the galaxy, but between 6h. and 10h. R.A. there appears a space almost devoid of them, which covers part of the region, 6h. 30m. to 14h., also devoid of novæ. The region thus avoided by the temporary and variable stars is, as M. Flammarion pointed out, the least complex and least dense large area of the Milky Way (*L'Astronomie*, April, p. 184).

THE VARIATION OF S ARÆ.—No. 3, vol. xxxiii., of *The Astrophysical Journal* (April, p. 197) contains an interesting paper by Dr. A. W. Roberts, in which the author propounds a theory to account for the peculiar light-curves of such "cluster-variables" as S Aræ. The general features of this type of light-curve are short period, a long stationary minimum, a very sudden rise to maximum, and a leisurely decline to minimum. After carefully studying the variation of S Aræ, Dr. Roberts suggests that such a light-curve may result from a combination of two distinct variations. The primary curve would be that of a Cepheid variable, depending upon an intrinsic variation of a bright star. The superimposed curve would be that of an Algol variable, and the theory demands that this shall be caused by the eclipse of the very bright, but relatively small, satellite by a larger, dark primary; the satellite is the Cepheid variable. There are various objections to such a theory, but the main observed facts are in favour of it. The great variation of the smaller star might be explained by the fact that the distance separating the pair is very small; thus the smaller companion may be revolving in a path which carries it through the rarer atmosphere of the larger star, the absorption of this atmosphere accounting for the change in apparent brightness.

THE "ANNUAIRE ASTRONOMIQUE" FOR 1912.—The Royal Observatory of Belgium is to be congratulated upon getting this useful *Annuaire*, for 1912, published so early, for although it necessitates omissions from the *revue* section, it facilitates the work of a number of the practical astronomers the book is intended for. The comprehensive list of observatories is omitted from this issue, but is to be republished every two or three years. In addition to the usual tables, ephemerides, "phenomena," &c., there are valuable articles on the tides, the universal time system, and, in a supplement bound with the *Annuaire*, Dr. Stroobant's work on the recent progress of astronomy.

THE ROYAL SOCIETY CONVERSAZIONE.

THE gentlemen's conversazione of the Royal Society was held in the society's rooms at Burlington House on Wednesday, May 10. The fellows and guests were received by Sir Archibald Geikie, K.C.B., president of the society, and many objects and experiments of scientific interest were exhibited. During the evening the Hon. R. J. Strutt gave a lecture on the afterglow of the electric discharge and on an active modification of nitrogen, and Mr. Joseph Barcroft lectured on adaptation to high altitudes in relation to mountain sickness. Experiments were shown by Prof. Strutt to prove that the well-known "afterglow" of Geissler tubes containing air is a phosphorescent flame, produced by the reaction of nitric oxide and ozone formed in the discharge. It was shown that nitrogen gives rise to a different kind of afterglow. The latter is regarded as resulting from the formation of an active modification of nitrogen, which slowly reverts to the ordinary form with luminosity. It was also shown that acetylene is spontaneously inflammable in this active nitrogen, and burns to cyanogen, the flame showing the characteristic spectrum of that gas.

Following our usual custom, we give a summary of the official description of exhibits, related subjects being here brought together for convenience of reference.

The Astronomer Royal.—(1) Model of orbit of Jupiter's eighth satellite. The model shows the path of the satellite around Jupiter from 1908 to 1916 as predicted by Dr. P. H. Cowell from the observations made in 1908 and 1909. The orbits of satellites VI. and VII. and of the inner satellites are also exhibited to scale and in their proper planes. The scale is 80 inches equal 1 solar unit, or 1 inch equals 1,160,000 miles. (2) Globe showing the motions of the two main star streams. The model has been constructed to show how an examination of the directions of motion of the stars reveals the presence of two great streams of stars. The statistics of the motions in different parts of the sky are summarised by the diagrams on the globe; it can be seen that for each region there are two "favoured directions" of motion in which the stars move in greatest numbers. These directions are traced on the globe, and converge to two apices. *The Director, Khedivial Observatory, Helwan, Egypt.*—Photographs of Halley's comet taken with the 30-inch Reynolds reflector by Mr. H. Knox Shaw. The photographs exhibited cover the period from April 16 to June 10, 1910. *Lowell Observatory, Arizona, U.S.A.*—(1) Photographic negatives of Halley's comet taken at the Lowell Observatory, May 4 to June 5, 1910. (2) Plates of slit spectrograms of Halley's comet. (3) Plates of slitless spectrograms of Halley's comet. Three important deductions follow from the photographs and spectrograms:—(i) The identification, by Dr. Slipher, of the three chief bands in the comet's spectrum as those which Mr. Fowler has shown to be the bands of carbon monoxide when under very low pressure. (ii) The totally diverse gaseous constitution pointed out by Dr. Slipher between the emissive constituents of the head and tail—the bright gases of the one being strong where those of the other are weak, and *vice versa*. (iii) Measurements by Prof. Lowell on knots in the photograph showed an accelerated velocity away from the head, as follows:—

	Angular distance from the nucleus to the point measured in the tail	Velocity of the point of the tail away from the nucleus
Knot 1	° 1 28	13·6 miles a sec.
Knot 2	3 12	17·2 ,, ,,
Knot 3	4 36	19·7 ,, ,,
Knot 4	6 15	29·7 ,, ,,

This, taken in connection with the spectrograms, disclosed

the significant fact that the accelerated knots were composed, to the extent of 75 per cent. of gases, not of solid particles, and that, therefore, *molecules* not only could be, but actually were, repelled by the action of the sun—contrary to current theory. *The Royal Astronomical Society.*—Series of photographs of nebulæ taken by Prof. G. W. Ritchey with the 60-inch reflector of the Mount Wilson Observatory, California, in 1910. *Mr. A. Fowler, F.R.S.*—Spectrum photographs showing the composition of the tails of comets. The spectra of the tails of comets exhibit a number of double bands, which the photographs prove to be identical with bands obtained from vacuum tubes containing carbon monoxide at a pressure of about 0·01 mm. An additional band, due to nitrogen, was present in comet Morehouse. *Solar Physics Observatory, South Kensington.*—(1) Spectroheliograms of the sun. Obtained on Friday, April 28, 1911, about six hours before the time of total eclipse at Vavau, and on Saturday, April 29. Composite pictures are shown of the prominences on the limb and the flocculi on the disc, taken in K_2K_3 (calcium) light. (2) Diagrams illustrating the southern hemisphere surface air circulation. (i) Scheme of general suggested circulation. (ii) Curves showing time difference of pressure changes. (3) Observations of Halley's comet at Fosterdown, Caterham. (i) The temporary observatory showing the three instruments used: 9-inch Henry prismatic camera, 10 feet focus, with one prism of 45° angle; 2-inch quartz calcite prismatic camera, 18 inches focus, with one prism of 30° angle; 6-inch Dallmeyer doublet camera, 4 feet focus. (ii) Plate showing single and double nucleus of comet, drawing of visual spectrum, and photographic spectrum. (4) Photographic laboratory spectra. Showing the flutings of titanium, vanadium, and chromium, employed in the reduction of the spectra of Antarian stars α Orionis, ο Ceti, α Scorpionis, &c.

Prof. R. W. Wood (Johns Hopkins University, Baltimore).—(1) Fluorescence and resonance spectrum of iodine vapour, with monochromatic excitation. Development of band spectrum by presence of helium. Light from a mercury arc is focussed at the centre of a large glass bulb, highly exhausted, and containing a small crystal of iodine. The iodine vapour shows brilliant fluorescence, and the spectroscope shows resonance spectra excited by the two yellow and the green mercury lines, which can be observed separately by interposing absorbing screens between the lamp and the bulb. In a bulb containing iodine crystals and helium at 2 mm. pressure, excited in the same way, the spectroscope shows the band spectrum of iodine superposed on the resonance spectrum. The collisions with the helium molecules apparently effect a transfer of energy from the excited electron system in the iodine molecule to all the other systems. In helium at 10 mm. the band spectrum alone is seen, as in the case of iodine vapour *in vacuo* excited by white light. (2) Echelette diffraction gratings. Gratings ruled with groove of known form on gold-plated copper by a crystal of carborundum. Used for work in the infra-red, and for experimental determination of the energy distribution in the spectrum in relation to the wave-length and the form of groove. The oblique faces of the grooves show a curious oblique image by reflection when the incidence is perpendicular to the plate. *Mr. Eric S. Bruce.*—Photographs and prints descriptive of types of dirigibles. The exhibit is descriptive of various types of airships on the lighter-than-air principle. *Mr. W. H. Dines, F.R.S.*—Working model of winding gear used for kite-flying at Pyrton Hill. *Prof. P. V. Bevan.*—Anomalous dispersion in metallic vapours. Anomalous dispersion at the red lines of potassium. The dispersion is produced by the method well known through the experiments of Prof. R. W. Wood with sodium vapour. Dispersion is also shown at the two violet lines of rubidium.

A. W. Clayden.—An actinograph or radiation recorder. The pen records the difference between the temperatures of two similar bimetallic spirals, of which one is blackened and exposed to radiation, while the other is bright and is shaded by a polished tin cover.—*Sir Henry Cunynghame and Prof. Cadman.*—(1) Contrivance fitted to miners' safety lamps for the detection of fire-damp. The contrivance consists of a small piece of asbestos soaked in carbonate of soda, which can, at will, be introduced into the flame of the lamp without the necessity of lowering it. The presence of small percentages of gas is immediately indicated by the appearance of an orange-coloured cap of the same character as appears when a wire, charged with soda, is introduced into a Bunsen gas flame. (2) A differential hygroscope (Sir Henry Cunynghame). The device consists of two thermometers, one with a wet and the other with a dry bulb. Instead, however, of being placed apart as usual, the stems of the two are brought into juxtaposition. They are not equally divided, but are so arranged and divided that when the top of the column of one of them sinks below the top of the column of the other, any desired hygrometric state of the air is at once seen by simple inspection without any scale or reference to any table, and irrespective of the temperature.

Messrs. Elliott Brothers.—The Anschütz gyro-compass. A practical application of a gyrostat as a mariner's compass. The apparatus consists of a gyrostat so suspended that its axis points to the true north, thus avoiding the necessity of any considerations of magnetic variation. The "directive force" is considerable, and on that account the apparatus can be made use of to transmit its indications to various points in a ship. *Mr. A. Mallock, F.R.S.*—Model of a "detached escapement" for pendulum clocks. The pendulum is free, in the sense that during the swing it makes no intermittent contacts with any solid. Near the end of each swing an electric contact is made by a fine wire dipping in a mercury cup. The current then established passes through the coils of an electromagnet, which, by means of a "remontoir" working a reciprocating lever, causes a very weak spring to act so as to maintain the oscillation. Constant density in the air surrounding the pendulum is approximately secured by the covering bell glass, the edge of which dips in a deep but narrow annular canal partly filled with mercury. An alteration of 1 inch in the height of the barometer alters the density of the enclosed air by about one part in a thousand. *Sir William Ramsay, K.C.B., F.R.S., and Dr. R. W. Gray.*—A micro-balance. This balance, made essentially from the designs of Steele and Grant, registers about 1,20,000th of a milligram. It is comparatively insensitive, one at University College being more than ten times as sensitive. The plan of adding small weight was worked out at University College; it consists in altering the apparent weight of the air in a sealed quartz bulb, suspended from one arm by a silica fibre, by altering the pressure of air in the balance-case. It was with a balance of this type that the density of niton was determined with less than one-tenth of a cubic millimetre. *Mr. J. J. Manley.*—Analytical balance with protected beam. The beam of this balance is completely enclosed by an auxiliary inner case, which is made of magnalium and fitted with plate-glass shutters. Beneath the base-plate of the case, baffle-plates are attached to the pan-suspensions and pointer. These baffle-plates intercept and deflect any convection currents ascending from the experimenter's hand, and so prevent them from striking the beam. By these combined devices, very great uniformity in the temperature of the balance beam may be maintained. *The National Physical Laboratory.*—A simple apparatus for measuring small thicknesses and displacements (exhibited by Mr. E. H. Rayner). *Dr. A. O. Rankine.*—A method of measuring the viscosity of a small quantity of gas. *The National Physical Laboratory.*—Portable potentiometer for temperature measurements with thermo-couples (exhibited by Dr. W. Rosenhain and Mr. S. W. Melsom). *Mr. Alfred W. Porter, F.R.S.*—An anomaly in the lagging of wires and pipes. A sheath consisting of a bad thermal conductor (like asbestos or glass) surrounding a sufficiently narrow hot body assists the escape of heat instead of retarding it. This effect is shown by means of a platinum wire heated electrically. Parts of the wire are covered with glass. Where the cover is the wire keeps quite cool (at about 100° C.) even when the bare part is at 1000° C. Examples of lagged steam-pipes are also exhibited.

Sir William Crookes, O.M., F.R.S.—Collection of old radiometers and otheoscopes. These experimental instruments were made by the exhibitor during his researches on repulsion resulting from radiation, and were used to illustrate the papers when they were read before the Royal Society in the years 1875–8. *Sir James Dewar, F.R.S.*—Radiometer acting by the pressure of mercury vapour given off by the liquid between the ordinary temperature and

−25° C. Radiometer, in concentrated beam of electric arc, stopped by charcoal liquid-air vacuum, and started again by mercury vapour at a pressure of about one fifty-millionth of an atmosphere. Activity again arrested on freezing out the mercury vapour in liquid air. *Mr. Francis Fox.*—(1) Radium bromide from pitchblende found in Trenwith Mine, St. Ives Consolidated Mines, St. Ives, Cornwall. (2) Specimen of rich pitchblende ore from the mine. *Mr. C. T. R. Wilson, F.R.S.*—Exhibition of the tracks of ionising particles in gases. (1) Tracks of α particles from radium through air. (2) Tracks of ionising particles produced by X-rays in air. The trail of ions left by each ionising particle is made visible by condensing water upon the ions. *The National Physical Laboratory.*—Ionisation in the electric furnace (exhibited by Dr. J. A. Harker, F.R.S., and Mr. C. G. Eden). *Prof. J. Norman Collie, F.R.S.*—Tubes showing electric discharge through neon. (1) Tubes showing the electric discharge through neon at high pressures. (2) Table showing the canal rays in neon. *Mr. C. W. Raffety.*—Enlarged photographs of the forms assumed by the brush discharge in air at reduced pressures. *Prof. E. Wilson and Mr. W. H. Wilson.*—(1) An improved high-tension discharge apparatus. (2) A high-tension electrostatic wattmeter (Prof. E. Wilson). *Prof. J. A. Fleming, F.R.S.*—Experiments showing visibly the oscillatory discharge of a condenser by Hemsalech's method, and its magnetising action on finely divided iron cores. *Mr. S. G. Brown.*—(1) Telephone relays. (2) Model of electrical stethoscope.

Prof. A. Liversidge, F.R.S.—(1) Series of sections of gold nuggets and photographs to illustrate the same. (2) Specimens and sections of Australian meteorites, and photographs. *Prof. W. J. Pope, F.R.S.*—Photomicrography in natural colours. Photomicrographs of rock sections, chemical preparations, and crystal interference figures are exhibited. The photographs were taken between crossed Nicol prisms by the Dufay process, in which the colours of the objects are reproduced. *Prof. E. G. Coker.*—Interference colours produced by transparent materials under stress. A beam of plane or circularly polarised light is passed through a plate of xylonite cut into any selected shape and loaded in any convenient manner. The material when stressed behaves like a doubly refracting crystal, and the two rays, into which the incident beam is divided, produce interference colours when passed through a Nicol's prism. The stress distribution may be inferred from the colour fringes produced. *Prof. J. Eustice.*—Experiments on stream-line motion in curved pipes. By means of filaments of coloured water, it is shown that when water is flowing from a straight to a curved pipe some of the filaments approach the sides of the pipe and cross from the outside to the inside of the curve, close to the walls. Several colours are used in the glass pipes, and the interlacing of the filaments caused by the vortex motion is clearly exhibited. *Mr. C. E. Larard.*—Twisted, cylindrical, and castellated metal specimens. *Mr. J. E. Marsh, F.R.S.*—(1) Experiments showing the separation of a homogeneous solution into three layers when the solution is warmed. (2) Solutions of certain salts in ether not miscible with excess of ether.

Prof. W. M. Thornton.—The electric charges associated with vegetable cells. When an electric current is passed through a weak emulsion, in water, of typical animal and vegetable cells, such as blood corpuscles, yeast, bacteria, and unicellular algæ, the animal cells appear to be driven to the positive pole, the vegetable cells to the negative, provided that the latter are from fresh, active growths. The movement reverses with the direction of the current, and is dead beat. *The Director, Royal Botanic Gardens, Kew.*—Cushion plants and their seedlings. The exhibit includes specimens and photographs of the balsam bog of the Falkland Islands (*Azorella glebaria*, A. Gray, Umbelliferæ), with a series of living seedlings raised in the Royal Botanic Gardens, Kew. *The John Innes Horticultural Institution.*—(1) "Chimæras" and Winkler's graft-hybrids, from Prof. E. Baur (Berlin). (2) A case of coupling in Pisum, between roundness of seed and power to produce tendrils, in the ratio 63 : 1 : 1 : 63. *Mr. A. D. Hall, F.R.S.*—A biological factor in soils limiting the activity of bacteria in producing plant food. Bacteria play an important part in the production of plant food in the soil from the accumulated organic residues; indeed, when other things are equal, the fertility of the soil is closely connected with the amount of bacterial activity. It has been shown, however, that a factor exists in ordinary soils limiting the activity of bacteria; this factor is biological, and appears to consist of large destructive organisms. When soils are kept in moist, warm conditions and well supplied with organic matter, as in a greenhouse, there is a marked accumulation of the limiting factor; a similar accumulation occurs in the soils of sewage farms. On the other hand, dry soil conditions are unfavourable to the factor. Heating the soil to 55° C., prolonged drying at lower temperatures, or treatment with various antiseptics such as toluene, kills the factor and leads to a marked increase of bacterial activity. In field and greenhouse soils there is a large production of plant food, and in sewage-farm soils an increased rate of decomposition.

Prof. H. E. Armstrong, F.R.S., and Dr. E. F. Armstrong.—The action of stimulants (hormones) in promoting enzymic activity. The specimens shown are in illustration of results described in recent communications on the functions of hormones in stimulating enzymic change in relation to narcosis and the phenomena of degenerative and regenerative change in living structures, and on the functions of hormones in regulating metabolism. Like the barley grain, leaves are shown to be provided with protective differential septa through which strong acids, salts generally, and substances such as the sugars do not pass, but which are freely permeable by organic vapours, weak acids, ammonia, and a few salts (mercuric chloride, &c.). The passage of the excitant into the leaf is shown in the case of the common laurel (*Prunus laurocerasus*) by the liberation of hydrogen cyanide, and in the case of the spotted Japanese laurel (*Aucuba japonica*) by blackening due to the decomposition of the glucoside aucubin. The active substances are for the most part non-electrolytes, which have little, if any, chemical activity. *Prof. R. T. Hewlett and Mr. J. E. Barnard.*—(1) The bactericidical action of light produced by a quartz mercury vapour lamp. Experiments on the bactericidical action of light indicate that a quartz mercury vapour lamp, in relation to its current consumption, is the most economical source at present available. The most actively bactericidical region in the carbon arc spectrum is that portion of the ultra-violet between λ 3280 and 2260. These radiations are produced freely by the mercury arc, and the action extends still further, practically to the limit of transmission by quartz. Owing to the almost entire absence of heat radiations in the mercury arc, any arrangement for heat absorption becomes unnecessary. This is an advantage of considerable moment, as any such method at present in use substantially increases the necessary exposure. (2) Apparatus for disintegrating bacterial and other organic cells. The apparatus consists of a metal containing vessel, in which a number of steel balls are placed, and which is caused to rotate. The balls are kept in position at the periphery of the vessel by a central steel cone, which, by suitable means, is prevented from rotating. Grinding action takes place between the steel balls and the inner surface of the vessel. The efficiency of the method is high, as after subjecting bacteria to the grinding process for from fifteen to twenty minutes, very few, if any, whole cells remain. Even those that are apparently whole have evidently parted with their cell contents, as may be demonstrated by the difficulty of staining them by any recognised bacteriological method. *Mr. Henry Crookes.*—Photographs and living cultures of *B. phosphorescens*, showing the germicidal action of some metals. Nutrient gelatin-agar is poured into Petri dishes containing small pieces of metal; when the medium has set, the surface is infected with *B. phosphorescens*. After twenty-four hours the bacteria grow luxuriantly, except in a zone surrounding the piece of metal, which remains entirely sterile. The extent of this *death-zone* varies with different metals. *Prof. M. C. Potter.*—Electrical effects accompanying the fermentative activity of yeast. The apparatus shown consists of a glass jar containing a porous cylinder, and into each of these are introduced solutions of glucose of equal concentration. Two platinum electrodes are placed one in the jar and one in the porous cylinder, and on the introduction of yeast into one of the solutions, the whole constitutes a type of galvanic cell. *Mr. S. G. Shattock and Mr. L. S. Dudgeon.*—(1) Resistance of *Bacillus pyocyaneus* to drying *in vacuo*. Experi-

ments devised to ascertain how far this factor might be *per se* lethal to bacteria in insterstellar space. A growth of *Bacillus pyocyaneus* raised from a thin film of a culture (made in peptone water) spread on glass and kept dried *in vacuo* for four months. The vacuum was produced by Sir James Dewar's method (a bulb of powdered charcoal surrounded by liquid air, after exhaustion by pump); after five days the vacuum was maintained by sealing off the tube. Light was excluded throughout. The bacillus when dried in the air (light excluded) dies within three months. The behaviour of this bacillus *in vacuo* is exceptional. Its maintenance of vitality corresponds with that of certain seeds under similar conditions. (2) Microscopic sections of urinary calculi from the human subject.

Hon. N. C. Rothschild.—Model of *Xenopsylla cheopis*, the tropical plague flea. *Mr. F. Enock.*—Photomicrographs of new species of British Mymaridæ. The insects comprised in the subfamily Mymaridæ are ovivorous in their habits, laying *their* eggs in those of various Homoptera and Coleoptera. Hitherto only thirty-five species have been recorded. The photomicrographs are part of the hundred to one hundred and fifty new species (many as yet unnamed) collected or bred during the past thirty-five years. *Sir W. B. Leishman, F.R.S.*—A parasite found in cases of infantile splenic anæmia. In cases of this disease, occurring in Tunis, Italy, Sicily, Malta, Portugal, and elsewhere, a protozoon—*Leishmania infantum*, Nicolle—has been found by C. Aicolle and others. It resembles closely the parasite of kala azar—*Leishmania donovani*, Laveran—and that of Oriental sore.—*Leishmania tropicum*, Wright. The disease is extremely fatal, and appears widespread in the Mediterranean littoral. It has recently been proved to be identical with the fatal disease of children known as "ponos," which occurs in some of the islands of the Grecian Archipelago. The parasites have also been found in dogs, and it is probable that they are transmitted from the dog to the child by the bite of some insect. *The Lord Avebury, F.R.S.*—(1) Moth from Peru (Caligo) imitating an owl. (2) Elytron of beetle (Pachyrhynchus). (3) Butterfly from Borneo (Ornithoptera-Brookeana) mimicking the tips of the leaflets of a pinnate leaf emerging from the deep shade of a tropical forest; the midribs of the leaflets and the serratures of the edges are well represented. *Mr. H. Eltringham.*—Colour drawings illustrating African mimetic butterflies. *Prof. Poulton, F.R.S., Mr. C. A. Wiggins, Mr. W. A. Lamborn, and Mr. E. G. Joseph.*—Recent observations on mimicry, protective resemblance, &c., in African and South American butterflies and moths. *Dr. Deane Butcher.*—Osmotic growths. Osmotic growths are mineral productions simulating the forms of organic life. They are obtained by sowing a mineral seed or nucleus in a concentrated inorganic mother liquor. The nucleus reacts with the liquid to form an insoluble gelatinous precipitate at the surface of contact. This semi-permeable extensible membrane is distended by the osmotic pressure within, and grows by a process of intussusception, branching and putting forth terminal organs as it reaches a solution of lesser concentration. Osmotic growths were first described by Prof. S. Leduc in his work on "The Mechanism of Life." *Dr. G. H. Rodman.*—(1) Stereoradiographs of monkey and tortoise. (2) A set of transparencies illustrating the development of the X-ray tube.

The Cambridge Scientific Instrument Company.—A new large sliding microtome. This instrument is a very powerful one, and will cut sections of superficial measurements up to 150 by 120 mm. (6 inches by 4¾ inches) through decalcified bone or cartilage. *Dr. W. J. Dakin.*—Sections showing stages in the sporogony of a new coccidian parasitic in the whelk. *The Marine Biological Association of the United Kingdom.*—(1) The culture of marine diatoms as food for developing larvæ. Some of the difficulties in the way of rearing marine larvæ in the laboratory have been overcome by keeping them in sterile sea-water and feeding them with cultures, as pure as possible, of suitable diatoms. (2) A collection of living marine animals from the neighbourhood of Plymouth. *Dr. W. S. Bruce.*—Deep-sea invertebrates: new or rare species taken by the polar ship *Scotia* in Antarctic seas during the Scottish National Antarctic Expedition (1902–4). *Mr. C. Tate Regan.*—Sketches illustrating instantaneous colour changes in sea-perches from the Bermudas. The sketches show colour phases observed in the New York Aquarium; these fishes are constantly changing their colour and markings; this is accomplished by the expansion and contraction of chromatophores, or pigment cells.

Mr. A. W. Clayden.—(1) Footprints from the Permian sandstones at Poltimore, Devon. Numerous footprints have been discovered during the last two years in the sandstones mapped in the Survey maps as Lower Sandstones They are of two types. Neither can be exactly matched from any of the known localities at which footprints of Permian age have been found, either in Great Britain, America, or Germany. They bear, however, a general resemblance to those obtained at Corncockle Moor and Penrith, though differing in detail. *Mr. R. W. Hooley.*—Skeleton of *Ornithodesmus latidens*, a pterodactyl from the Wealden shales of Atherfield, Isle of Wight. *Mr. W. Taylor.*—Remains of fossil reptiles from the Triassic sandstone of Lossiemouth, Elgin. *Prof. W. M. F. Petrie, F.R.S.*—Roman portraits, first century A.D. These portraits are painted with coloured wax upon thin panels of cedar. On some a fresh coat of paraffin has been now added for security. They were placed over the faces of the mummies and bandaged down round the edge. They are from the same cemetery, at Hawara, Egypt, as those in the National Gallery, a site now exhausted by the British School of Archæology in Egypt. *Dr. Vaughan Cornish.*—Photographs of surface waves. *Dr. Tom G. Longstaff.*—Mountain photographs.

THE IRON AND STEEL INSTITUTE.

THE annual general meeting of the Iron and Steel Institute opened on May 11 under the presidency of his Grace the Duke of Devonshire. The meetings were held at the Institution of Civil Engineers. The Bessemer gold medal for 1911 was presented to Prof. Henri Le Chatelier, of Paris, who attended for this purpose. The Carnegie gold medal was awarded to Mr. Felix Robin, who has conducted researches on the wear of steels and their resistance to crushing. Carnegie research scholarships have been awarded to Messrs. W. M. Guertler, of Berlin, G. Hailstone, of Birmingham, R. M. Keeney, of Colorado, U.S.A., and G. Dietrich Röhl, of Freiberg, Saxony. Messrs. J. Newton Friend, of Darlington, and T. Swindon, of Sheffield, have had additional grants made to them to enable their researches to be extended and completed.

Sixteen papers in all were presented for discussion; the principal points dealt with in a few of these are given below.

Dr. J. E. Stead contributed some notes on the welding up of blow-holes and cavities in steel ingots. The evidence advanced shows that, if the blow-holes in steel ingots are subcutaneous, *i.e.* under the skin and having no opening to the atmosphere, and the heating of the metal is sufficiently high, say 1000° C. and above, the cavities will weld up completely on being rolled or forged, provided they contain no foreign matter. It is doubtful whether pipe cavities can be so readily welded. The upper ends of the pipes in ingots are open to the gases of the heating furnace, and the cavities become coated with oxide scale, which prevents the metallic surfaces from coming into contact. If the pipe is deep and is bridged over at intervals with diaphragms of solid steel, it is not improbable that welding below these bridges might be effected, provided that the imprisoned gases become forced back into the steel and do not form layers of highly compressed gas between the steel surfaces, and so prevent these surfaces from coming into direct contact. Prof. Howe has suggested that forged steel blooms should be heated for a long time to above the welding point, so as to complete the reabsorption of the gas. This is based on two assumptions: first, that the gases of the cavities are capable of being forced by pressure into the hot steel and of becoming occluded there; secondly, that what gas is not so forced into the metal will diffuse into it during prolonged heating at a high temperature. Prof. Howe's suggestion calls for experimental evidence as regards the quantity of mixed gases or of any gas which can be forced by pressure into solid steel, and also as regards how much of it will come out again on removal of the pressure, and it is understood that a research has