SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 31.—"The Abductor and Adductor Fibres of the Recurrent Laryngeal Nerve." By J. S. Risien Russell, M.B., M.R.C.P. Communicated by Prof. V. Horsley, F.R.S. (From the Pathological Laboratory of University College, London.)

The first part of the following research consists in the separation and isolation of the different bundles of nerve fibres of which the nerve trunk is composed, electrical excitation of each separate bundle, and observation of the effects produced on the vocal cords by such excitation.

Exposure of the different bundles of nerve fibres, under exactly similar circumstances, to the drying influence of the external air, with observation of the relative duration of vitality possessed by the different bundles, forms the second part of the investigation.

Other methods were next instituted to control the results of the foregoing, and the first of these, constituting the third part of this work, consisted in tracing by *post-mortem* dissections each bundle of nerve fibres separated in the nerve trunk to its termination in the mucous membrane or in a muscle of the larynx.

The next control method consisted in exposing the muscles of the larynx immediately after death, and direct observation of them during excitation of the separate bundles of nerve fibres, this being controlled by occasional excitation of individual muscles themselves. This forms the fourth part of the investigation. The fifth or last part of the research served as a third control method, and consisted in observations of the muscular degenerations which followed division of one or other bundle of nerve fibres in the nerve trunk, three weeks after such division.

The results of these experiments show clearly :—

(1) That the abductor and adductor fibres in the recurrent laryngeal nerve are collected into several bundles, the one distinct from the other, and each preserving an independent course throughout the nerve trunk to its termination in the muscle or muscles which it supplies with motor innervation, a condition of things, the possibility of which was suggested by Dr. Semon more than ten years ago, from the evidence of pathological facts.

(2) That while in the adult animal simultaneous excitation of all the nerve fibres in the recurrent laryngeal nerve results in adduction of the vocal cord on the same side, abduction is the effect produced in a young animal by an exactly similar procedure.

(3) That when the abductor and adductor fibres are exposed to the drying influence of the air under exactly similar circumstances, the abductors lose their power of conducting electrical impulses very much more rapidly than the adductors—in other words, they are more prone to succumb than are the adductors—a fact which has for long been recognized and insisted on by Dr. Semon as being the case in the human subject, and in support of the truth of which that observer has adduced so many powerful arguments.

(4) That, even in the young dog, the abductor nerve fibres, though perserving their vitality much longer than in the case of the adult animal, nevertheless in the end succumb before the adductor fibres.

(5) That this death commences at the point of section of the nerve, and proceeds gradually to its peripheral termination, and does not take place in the whole length of the nerve simultaneously.

(6) That it is possible to trace anatomically the abductor and adductor fibres throughout the whole length of the recurrent laryngeal nerve to their termination in the one or other group of laryngeal muscles, and that these fibres appear to bear a fixed relationship to each other throughout their course, the abductors being situated on the inner side of the nerve or that next to the trachea, while the adductors are on the outer side.

(7) That it is possible to so accurately separate these two sets of fibres in the nerve trunk that excitation of either of them evokes contraction of the abductor or adductor muscles, as the case may be, without evoking any contraction whatever in the muscle or muscles of opposite function

(8) That the bundle of nerve fibres concerned with one function may be divided without injury to that concerned with the opposite function, and that such division is followed by atrophy and degeneration of the muscles related to that function without any such changes being detectable in the muscles related to the opposite function.

Further, it is clear that the theory advanced by Mackenzie, and which has since found favour with many, viz. that possibly the reason why the abductor fibres succumb before the adductor in affections of the nerve is because they are more superficially and circumferentially arranged, while the adductor fibres are situated deep in the substance of the nerve, is shown by these experiments to be entirely erroneous.

One point which is difficult to explain is why there should be so marked a difference between the recurrent laryngeal nerve of a young and that of an adult dog, as regards the respective predominance of abductor or adductor representation in the trunk of the nerve. Possibly the reason why the abductor influence is in the ascendency in the young dog is because the power of phonation is still imperfectly developed, and with it both the muscle and nerve fibres subserving this function are also imperfectly developed, while the function of respiration is from the beginning fully developed, and with it the muscle and nerve fibres connected with that function. That the reverse should be the case in the adult animal may well be due to the fact that phonation is perfectly developed, while respiration has become so automatic that very feeble stimuli are necessary to keep it going.

"Interference with Icterus in Occluded Ductus Choledochus." By Vaughan Harley, M.D.

This paper is one of considerable biological-pathological interest, as it gives an experimental explanation of the strange discovery made by Kufferath, in 1880, that by placing a ligature on the thoracic-duct, the jaundice-producing effects of an occlusion of the common bile-duct could be instantly arrested—which fact Kufferath did not so much as even attempt to explain ; and no other physiologist having either confirmed or negatived the statement, far less offered any explanation of it, there were two problems requiring to be solved when Dr. Vaughan Harley entered upon the investigation :—

(1) Does ligaturing the thoracic duct actually prevent the jaundice which otherwise inevitably occurs after occlusion of the common bile-duct ?

(2) If it does, how can such a remarkable phenomenon be explained ? seeing that the chyle-transmitting thoracic duct has no apparent physiological connection with the ductus choledochus.

Kufferath only kept the animals he operated upon alive from 1 to 2½ hours—a period of time far too short to admit of any important morphological changes occurring, which could yield a clue to the mystery. Hence the first thing was to try and find a means of keeping the animals experimented upon alive for much longer periods of time, after both ducts had been ligatured. This was successfully done by feeding the dogs on fat-free food, containing only small proportions of proteids. It was found that when so fed dogs could not only be kept alive for weeks, but even months ; and, what was stranger still, they even gained in weight.

The non-appearance of jaundice after ligature of the bile-duct when the chyle-duct was also tied, appeared remarkable from the fact that it was by all believed that both bile pigments and bile acids were always absorbed by the blood capillaries from the bile ducts ; whereas it is now shown experimentally, in this paper by Dr. Vaughan Harley, that the blood capillaries have absolutely nothing whatever to do in the matter, and that, contrary to what has been up till now imagined, the pent-up bile is solely absorbed from the bile-ducts by lymphatics, and carried by them into the general circulation by the circuitous route of the thoracic duct.

Dr. Vaughan Harley has further demonstrated experimentally that, if a sufficient length of time is allowed to elapse after ligaturing the thoracic duct, bile pigment and bile acid again appear in the urine just as if the thoracic duct had not been ligatured at all, and that this arises from the fact that collateral lymphatics shoot out from the thoracic duct at a point below the ligature, and convey its contents into the right innominate vein. Hence he says that the three following conclusions may be drawn from the results obtained from his experiments :—

(1) That bile existing in the bile-ducts can only reach the blood through the intervention of the lymphatics.

(2) Seeing that lymphatics surround the liver blood-vessels, one is forced to believe that bile pigment and bile acid cannot pass through the endothelium of the blood capillaries in the liver ; or, perhaps, even throughout the body. The fact that bile reaches the blood when it has escaped into the peritoneal cavity is no argument against this view. For in that case it reaches the blood through the lymphatics of the diaphragm.

(3) After the left thoracic duct of the dog has been ligatured for some time, collateral lymphatics are opened up or developed from it leading into the right innominate vein.

Physical Society, March 25.—Prof. S. P. Thompson, Vice-President, in the chair.—A note on the electromotive forces of gold and platinum cells was read by Prof. E. F. Herroun. Modern text-books put gold before platinum in Volta's electro-positive series, and thus one is led to expect a greater evolution of heat when gold combines with (say) chlorine, than when platinum does so. This, however, is not the case, for Julius Thomsen gives for the heat of formation of platinic chloride a value considerably greater than that for auric chloride. Gold should therefore be electro-negative to platinum. The few experimenters who have tested such cells, arrived at different conclusions, hence the author took up the subject, and examined experimentally the E.M.F.'s of zinc-platinum and zinc-gold cells, the metals being immersed in solutions of their chlorides of equal molecular strength. Instead of platinic chloride a solution of sodio-platinic chloride was employed. From Thomsen's thermo-chemical data, the E.M.F. of such a zinc-platinum cell should be 1·548 volts, whilst experiment gave values between 1·70 and 1·473, according to the previous history of the cell. The average E.M.F. was about 1·525. Allowing the cell to send a current reduced the E.M.F. considerably, but it partly recovered on standing. Renewing the sodio-platinic chloride reproduced the high initial E.M.F. of 1·7 volts. This high value, and the uncertainty of the E.M.F. after sending a current, the author believed due to dissolved oxygen. Zinc-gold cells, the metals being immersed in solutions of their chlorides, gave more constant results, the maximum being 1·855, and the minimum 1·834 volts, whereas from thermo-chemical data the E.M.F. should be 2·044. On replacing a gold plate by a platinum one, the E.M.F. fell to 1·782. Other experiments showed that gold is slightly electro-positive to platinum in water or dilute HCl, but in aqua regia the positions are reversed. Prof. Ayrton said the experimental E.M.F.'s were fairly close to the theoretical values, and thought the differences might arise from occlusion of gases, which, although not taken into account in the thermo-chemical experiments, might have considerable effect on the electrical values. Platinum, especially, had remarkable occluding properties. Mr. Enright pointed out that, if any gases were disengaged by the reactions in the cells, their thermal values must be allowed for. The Chairman (Dr. Thompson) believed that some discrepancy between the calculated and observed values of the E.M.F.'s might be due to the calculations only being carried to the first degree of approximation. The complete expression contained, amongst others, a term depending on the temperature coefficient of the cell. On the subject of variation of the sign of E.M.F. with the strength of solutions, he said he had observed similar effects with cyanide solution. Dr. Herroun, in reply, said care was taken to expel as much of the occluded gas as possible before using the plates, and no gases were formed in the reactions. To Dr. Thompson he pointed out that Clark's cell had an E.M.F. greater than that calculated from thermo-chemical data, hence the temperature coefficient ought to be positive, but, as a matter of fact, it is negative. The discrepancy between the calculated E.M.F. and the observed he believed due to inaccurate determinations of the thermo-chemical constants of mercury salts.—A new instrument for showing the effects of persistence of vision was exhibited and described by Mr. E. Stuart Bruce. The instrument, which the author calls an "aërial graphoscope," consists of a narrow wooden lath mounted on a whirling machine, so as to be rotated rapidly in its own plane. The lath is tinted gray in the centre, and shades off to white at the ends. When rotated rapidly, it presents the appearance of a nearly uniform screen or disk, owing to persistence of impression. Ordinary lantern-slides were projected on this aërial screen with remarkable effect, for the pictures appeared suspended in mid-air. The author explained that the object of darkening the lath near the middle was to give a more uniform illumination to the picture or disk. On covering up the centre portion of the lath with white paper, the middle of a picture projected on it was much more strongly illuminated than the edges. Mr. Blakesley pointed out that the effect produced by darkening the centre of the lath might be attained by painting white sectors on a black lath.—A paper on some electrical instruments was read by Mr. R. W. Paul, and the apparatus exhibited. He first described a new form of standard ohm, the distinguishing feature of which is that the wire is wound in one flat spiral, and contained between two thin brass plates. The whole of the wire is thus practically at the same level in the water-bath, and therefore will be more likely to be at uniform temperature throughout than coils having considerable vertical depth. A thermometer passing down the central tube has its bulb on the same level as the wire; and another thermometer, placed in the water-bath at the same level, serves to check the uniformity of temperature. In order that the width of the coil may not prevent convection currents in the bath, the screws which fix the two brass plates together have large holes through them. Dr. Fleming's suggestion of forming the upper ebonite insulator into an oil-cup has also been carried out. A new form of Wheatstone bridge was next shown, possessing all the advantages of the dial pattern combined with great facilities for cleaning. There are four resistances in each proportional arm, and the adjustable arm has four sets of coils—units, tens, hundreds, and thousands—each set consisting of ten equal coils. The ends of each coil are connected to brass sockets, fixed, about an inch apart, on the ebonite top. Successive coils are put in circuit by placing a plug attached to a flexible cord in the required socket. Special contact-bars are provided, whereby two or more coils of any set of ten may be put in parallel arc, so as to get accurate resistances of large carrying capacity. These bars are also useful for obtaining high ratios between two resistances, a point of considerable importance in the testing of large resistances. Amongst the advantages claimed are: better insulation, avoidance of surface leakage by providing ample facilities for cleaning, small block error which is constant and easily measured, and no loose plugs required. Each set of ten coils may be used as separate circuits. By means of two travelling terminals the box may also be used as a potentiometer reading to 1 part in 10,000. A reflecting galvanometer with several improvements was then exhibited and described. The coil is supported on an ebonite pillar fixed to a tripod, below the centre of which controlling magnets on the Siemens principle are pivoted. The pillar gives good insulation from earth, and the adjustment of the control can be made without setting the needle in vibration. The two halves of the coil are wound according to Sir W. Thomson's law, and fixed in ebonite boxes turned to fit them. They are thus kept permanently in shape. The ebonite boxes are interchangeable, so that either high- or low-resistance coils can be used in the same stand. The coils have separate terminals, and can therefore be used in series or parallel or differentially. The mirror is placed in a metal box below the coils. When intended for an astatic instrument, magnets are put behind the mirror, and the metal box serves to damp the vibrations. For ballistic work the mirror has no magnets on it, and the damping may be regulated by sliding in or out a plug which carries the window of the mirror box. Mr. Swinburne inquired whether the plan of using two vertical magnets to form an astatic system had been tried, and with what result. He also asked if dial bridges made with switches instead of plugs would not be advantageous. Dr. Sumpner said vertical needles had been used at the Central Institution, and found satisfactory. Mr. A. P. Trotter wished to know whether there was any very great advantage in designing galvanometers with a minimum amount of wire. A galvanometer was often required for many different purposes, and it did not follow that one with a minimum amount of wire was the best all-round instrument. Mr. C. W. S. Crawley made inquiries as to the magnitude of the block error in the form of Wheatstone bridge shown, for he thought the flexible cords would make it considerable. In reply to Mr. Swinburne, he said he had found the variations in switch bridges greater than in plugs. Prof. S. P. Thompson thought it was not generally known that the best shape of galvanometer coil depended on whether the instrument was to be used as an ammeter or voltmeter. The shape determined by Sir W. Thomson was a voltmeter coil; that for an ammeter was much shorter axially. Mr. Paul, in reply, said he used one or other shape of coil according to the use for which the galvanometer was intended. The block error in the Wheatstone bridge was very small, and quite negligible for most purposes. When very great accuracy was required, the error, being constant, was easily measured and allowed for.

Royal Microscopical Society, March 16.—Dr. R. Braithwaite, President, in the chair.—Mr. G. C. Karop exhibited and described Messrs. Swift's new fine adjustment to the substage. Mr. Karop stated that in this substage one complete revolution was equivalent to a vertical movement of the $\frac{1}{125}$th of an inch.—Mr. E. M. Nelson gave a *résumé* of the contents of two papers, the first of which was entitled "Virtual Images and Initial Magnifying Power," and the other "On Penetration in the Microscope."—Dr. W. H. Dallinger said that an important

communication had been received from Prof. Czapski, "On the Calculable Limit of Microscopic Vision." Its purpose was to show why it was that great numerical aperture was of such high value in the determination of minute structure, and to inquire whether —seeing that a numerical aperture of 1·60 was so utterly unavailable in the case of living objects, or of such as did not admit of being put into media of sufficiently high refractive index—there was any method of making these high numerical apertures available for such objects? The author had inquired into the value of monochromatic light for such a purpose, and the latter part of his paper was to show that by using the blue rays of such light with large apertures it was possible to increase the aperture so as to obtain the relatively great advantage which would result from a difference between 1·40 and 1·75. Mr. F. Crisp thought it should be pointed out that the broad fact dealt with in this paper was one which had long ago been explained. Dr. Dallinger said he had himself worked it out some time ago, obtaining as a result the difference between 1·40 and 1·70 which came remarkably near to that mentioned in the paper. Mr. Crisp said that the aperture table which was printed with every number of the Journal gave them the difference in resolving power between white light and monochromatic blue light with objectives of various apertures.—Prof. F. Jeffrey Bell gave an outline of the contents of a paper by Mr. H. L. Brevoort, entitled "Observations on the Brownian Movement," and pointed out that, whilst the general conclusion arrived at by the author was that light had some influence in the matter, he did not seem to have taken any precautions as to temperature, an element which was usually considered to be an active agent in this phenomenon.—A letter from the Hon. J. G. P. Vereker was read, replying to some points raised during the recent discussion of his paper "On the Resolution of *Podura* Scales."—Dr. A. C. Mercer read a paper on photomicrography as illustrated by a collection of seventy-three lantern-slides. Among the slides exhibited was a group which threw light on the vexed question of *Podura* scale structure. The author showed conclusively that the so-called featherlets on *Podura* scales are only inflations of the membrane. A number of slides also proved the value of the microscope as a means of detection in cases of forgery, or when alterations were alleged to have been made in promissory notes, the evidence afforded in one important case being very clearly demonstrated. A further group of slides was devoted to the illustration of the apparatus used in photomicrography. The President, in proposing a vote of thanks to Dr. Mercer, said he regarded the exhibition as the finest examples of what could be done by means of photomicrography.

Entomological Society, March 23.—Dr. D. Sharp, F.R.S., Vice-President, in the chair.—The Secretary read a letter from the City of London Entomological and Natural History Society on the subject of a proposed Catalogue of the Fauna of the London District.—Mr. G. C. Champion exhibited a number of new species of Longicornia from Mexico and Central America, recently described by the late Mr. H. W. Bates, in his paper entitled "Additions to the Longicornia of Mexico and Central America, with remarks on some previously recorded Species," read at the last meeting of the Society.—Mr. S. Stevens exhibited three very rare species of *Noctuæ*, viz. *Noctua flammatra*, *Leucania vitellina*, and *Laphygma exigua*, all taken by Mr. H. Rogers at Freshwater, Isle of Wight, in the autumn of 1891.—Mr. F. C. Adams again exhibited the specimen of *Telephorus rusticus*, in which the left mesothoracic leg consisted of three distinct femora, tibiæ, and tarsi, originating from a single coxa, which he had shown at the meeting on the 24th of February last. The specimen was now reversed, to admit of the better examination of the structural peculiarities of the leg, upon which Dr. Sharp, Mr. Champion, and Mr. Jacoby made some remarks.—Mr. Osbert Salvin, F.R.S., exhibited a series of mounted specimens of the clasping organs in the male of several species of *Hesperidæ*.—Dr. Sharp exhibited, for Mr. F. D. Godman, F.R.S., a collection of Orthoptera recently made in the Island of St. Vincent, West Indies, by Mr. H. H. Smith, the naturalist sent to that island by Mr. Godman in connection with the operations of the Committee appointed by the British Association and the Royal Society for the investigation of the Fauna and Flora of the Lesser Antilles. It was stated that the collection had recently been referred to, and reported on by, Herr C. Brunner von Wattenwyl and Prof. J. Redtenbacher.—Mr. J. W. Tutt exhibited and remarked on a series of various forms of *Orrhodia vaccinii* and *O.* (*spadicea*) *ligula*.—Mr. C. G. Barrett exhibited and made remarks on a series of specimens—including some remarkable varieties—of *Bombyx quercus* and *Odonestis potatoria*. A long discussion ensued as to the probable causes of the variation exemplified, in which Mr. Tutt, Mr. E. B. Poulton, F.R.S., Mr. H. Goss, Mr. Jacoby, Mr. Salvin, F.R.S., Mr. Bethune-Baker, Dr. Sharp, and Mr. Distant took part.—Mr. G. A. J. Rothney sent for exhibition a number of specimens of *Camponotus compressus*, *C. micans*, *Œcophila smaragdina*, *Sima rufo-nigra*, *Solenopsis geminata* var. *armata*, and other species of Ants, from Calcutta. He also communicated a short paper on the subject, entitled "Notes on certain species of Calcutta Ants and their habits of life."

PARIS.

Academy of Sciences, April 4.—M. d'Abbadie in the chair.—Notice of the works of the late M. de Caligny, by M. J. Boussinesq.—On certain systems of equations with partial differentials, by M. Emile Picard.—Delivery from circular orifices, and reappearance between their different superficial elements, by M. J. Boussinesq.—On the native iron of Cañon Diablo, Arizona, by M. Mallard. The author has examined some specimens of native iron found in Arizona, the origin of which is doubtful. The iron contains only 3 per cent. of nickel, and when polished shows cavities filled with a black substance supposed to be iron carbide. In this comparatively soft substance a diamond, 0·5 mm. in diameter, was found by Prof. Koenig in 1890. The iron appears to be of meteoric origin, judging from its appearance. Mr. Foote has pointed out that the existence of a singular elevation, called Crater Mountain, near the place where large fragments of the material were found, may have something to do with their occurrence, but he has been unable to find any volcanic rocks in the neighbourhood. So the question of origin remains *sub judice*, and a critical examination of the region will have to be made before it can be settled.—On the spark spectra of gallium, by M. Lecoq de Boisbaudran. The spectrum given when sparks from a large induction coil play upon the surface of gallium chloride consists of two characteristic violet lines, and a wide, nebulous band in the green. If the same coil is used with a condenser and metallic gallium, a much more complex spectrum is obtained, and one from which the band in the green (wavelength = 502·33) is absent. The two lines in the violet (wavelengths 417·04 and 403·19) are bright under both conditions of sparking. Substituting a small coil for the large one, M. Lecoq de Boisbaudran found that, besides the two violet lines, two others, at the approximate wave-lengths 641·24 and 639·23, were seen when no condenser was employed. On introducing the condenser, the latter line suffers a considerable diminution in intensity. Another line occurs at λ 632·67, and a nebulous line about λ 535·51. The wave-lengths and characters of all the lines observed under the three conditions are stated in detail. —On a method for the determination of the mechanical elements of helical propellers, by M. S. Drzewiecki.—Observations of Swift's comet (*a* 1892), made at the Paris Observatory with the West Tower equatorial, by M. G. Bigourdan. Observations for position were made on March 29, 30, 31, and April 1, 2, 3, 4.—The two asteroids discovered respectively by Wolf on March 28, and Charlois on April 1, were observed for position by Mdlle. Klumpke, at the Paris Observatory, on March 31 and April 1 and 2.—Observations of Swift's comet (1892, March 6), made at Lyons Observatory, by M. G. Le Cadet. Position observations were made on March 31 and April 1.—On the indices of refraction of saline solutions, by M. Paul Bary.—New unipolar conductivity of gases, by M. Edouard Branly.—On the attraction between two disks separated by a dielectric, by M. Julien Lefèvre. The author has measured the attraction between two electrified disks separated by a dielectric not in intimate contact with them, and finds it to be represented by the following formula:—

$$\frac{F}{F'} = \left(\frac{e + e'}{\frac{e}{k} + e'}\right)^2,$$

where F′ equals the attraction stress between the plates at the distance $e + e'$ in air; F the attraction at the same distance when a lamina whose dielectric constant is k, thickness e, and having parallel faces, is placed between the plates; e' therefore represents the sum of the thickness of air between the lamina and the electrified disks.—On the production, in the dry way, of some anhydrous crystallized sulphates, by M. P. Klobb. (See Notes.)—On a nitroketone derived from camphosulphophenol, by M. P. Cazeneuve.—On the composition

of pinnaglobine, a new globulin, by M. A. B. Griffiths.—On the existence of parallel series in the biological cycle of Pemphigiens, by M. Horvath.—The history of the *Garcinia* of the sub-group *Rheediopsis*, by M. J. Vesque.—Researches on the variations in the transpiration of flowers during their development, by M. G. Curtel.—On some diseases of mushrooms, by M. Julien Costantin.—On the *rôle*, distribution, and direction of ocean currents in France during the Upper Cretaceous period, by M. Munier-Chalmas.—The tubercular vaccination of the dog, by MM. J. Héricourt and Ch. Richet. The authors' experiments indicate that, by the inoculation of tuberculosis *aviaire*, dogs can be vaccinated against human tuberculosis.—On a new pathogenic diplobacteria obtained from the blood and urine of influenza patients, by MM. Teissier, Roux, and Pittion.—Measures of the variations in the lengths of the Dauphiny glaciers, by Prince Roland Bonaparte. Of the sixteen glaciers whose movements were studied in 1890, six were found to be advancing, eight retreating, and two stationary. In 1891 the results obtained indicated that six glaciers were advancing, five retreating, and five stationary. The amounts of movement measured are given in the paper.

BERLIN.

Physiological Society, March 4.—Prof. Munk, President, in the chair.—Prof. Zuntz spoke on Dr. Werigo's experiments respecting the influence of oxygen on the elimination of carbon dioxide by the lungs. When an animal breathed pure oxygen into one lung and simultaneously pure hydrogen into the other, Werigo found more carbon dioxide in the alveolar air of the oxygen-lung than in that of the hydrogen-lung, and hence concluded that oxygen furthers the escape of this gas. Prof. Zuntz, however, pointed out that the diffusion of carbon dioxide from the alveolar air into the contents of the cannulæ used for the introduction of the gases must be greater on the side supplied with hydrogen than on the other, and that hence less carbon dioxide must naturally be found in the alveolar air of the former than of the latter. The really important question whether the absorption of oxygen leads to an increased elimination of carbon dioxide has therefore not yet been answered. Werigo's experiments should be repeated, using oxygen and nitrogen.

Meteorological Society, March 8.—Prof. Schwalbe, President, in the chair.—Dr. Lachmann gave an account of a research on the extremes of temperature in Europe. He first assured himself of the trustworthiness of the readings of his maximum and minimum thermometers. He then determined for stations which afford prolonged series of data how many years must be taken into account in order to arrive at a trustworthy mean, and found that in the case, *e.g.*, of Brussels, ten years suffice for the determination of its maximum temperature, whereas some forty years must be taken into account when determining its minimum temperature. After comparing the extremes of temperature with the periodic observations, he discussed the maximal and minimal temperatures met with in Europe, and gave an account of their geographical distribution. When those places with equal maxima are joined by lines, curves are obtained which on the whole resemble the July isothermals, and are the same as the latter if 12° be added to them. The curves of equal mean minimal temperatures correspond to the isothermals for January after subtracting 10°–11°.—Dr. Knorre read a letter containing an account of a thunderstorm on January 31, near Jüterbock, accompanied by hail and light phenomena, which must undoubtedly be regarded as a case of St. Elmo's fire.—Prof. Spörer exhibited photographs of the recent large sun-spot group which he observed between February 9 and 16, and which were most probably connected with the magnetic storm of the 13th and 14th of that month.

Physical Society, March 11.—Prof. Kundt, President, in the chair.—Dr. Stapff spoke on the increase in density of the interior of the earth, and deduced a mathematical formula for its determination.—Dr. Arons described experiments on the electrical polarization at the two sides of a metallic plate immersed in an electrolyte at right angles to the currrent. A platinum plate 0·1 mm. thick gave not only an evolution of gas but an increase of resistance, results which were entirely absent when a gold-beater's film was employed, as also with a film of silver. Pores in the metallic films were not the cause of the absence of polarization, since it appeared even when a small hole was bored in the above-mentioned platinum plate. When four gold-beater's films were superposed, they led to a slight increase of resistance and feeble polarization.—Dr. Rubens stated that he had extended his observations on the dispersion of the ultra-red rays from w.l. 5·7 μ to w.l. 8 μ. He found that the curves for the index of refraction do not correspond with Langley's surmises. As far as w.l. 5·3 μ the curves of the two observers coincide, but the rectilinear course which the curve assumes at w.l. 5·0 μ is not persistent with light of greater wave-length; it tends to rise slightly from the line of abscissæ. Hence Langley's interpolations for very long waves are inaccurate.

AMSTERDAM.

Royal Academy of Sciences, February 27.—Prof. van de Sande Bakhuyzen in the chair.—Dr. Moll communicated some results he had obtained on the karyokinesis of Spirogyra. By embedding the threads in collodion and paraffin, and cutting them into series of sections with the microtome, he has observed a special organization in nucleolus and karyoplasma, leading to the formation of the chromatic segments; he has been able to establish with certainty the existence of the phenomenon of heteropoly in Spirogyra; and lastly, he has seen that Tangl's and Strasburger's *Verbindungschlauch* between the daughter-nuclei appears at an earlier stage in the form of some vacuoles, of which a single one finally prevails.—Mr. van der Waals treated of the phenomenon of incomplete mixture of two liquids, in those cases in which the mixture is complete at a higher temperature, and gave a formula founded on his "theory of a mixture of two substances," by which the volumes of a given weight of dissolved matter may be calculated in the same way as the volumes of liquid and vapour of a single substance.—Mr. van Bemmelen treated of the difference of colloid oxides and crystalline hydrates, especially in reference to the oxide of iron. He demonstrated that only Brunck and Graebe have observed the crystalline hydrate of a definite composition. The substance prepared by Rousseau is not a crystalline hydrate, but ferrite of potassium, transformed by the action of water into amorphous hydratic oxide (of indefinite composition), and only pseudo-crystalline, as it has preserved externally the crystalline form of the ferrite.—Mr. Franchimont showed a sample of ethylaldoxime (acetaldoxime), a beautiful crystallized body, melting at 48° C. The ethylaldoxime, discovered in 1882 by V. Meyer, was described by him and by Petraezek as a fluid, boiling at 114°–115° C. The crystallized ethylaldoxime has the same boiling-point, and may be a stereo-isomery.

CONTENTS.