reflected impulse which returns from the open end of the pipe according to Bernouilli's theory, and that these elementary impulses, coming from different distances, may be altogether equivalent to a single reflected impulse from a point at a little distance from the end of the pipe. It is not a little interesting that a confirmation of this little-known fact should have come from so far off, and have been obtained by such simple experimental means.

W. H. STONE

14, Dean's Yard, S.W., January 8

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 13, 1880.—On currents of motion in polarised platina, by H. Helmholtz.—On the course of polarisation currents, by A. Witkowski.—On the changes of form and volume of dielectric bodies wrought by electricity, by W. C. Röntgen.—On Lichtenberg figures and electric valves, by W. von Bezold.—On the electromotive forces of some zinc-copper elements, by Fr. Fuchs.—On the measurement of electric conductivities, by G. Kirchhoff.—Some experiments on induction in conductors, by F. Himstedt.—On the discharge of electricity in rarefied gases, by E. Goldstein.—On the production of harmonic tones through vibrations of a fundamental tone, by R. Koenig.—Researches on the law of dispersion, by O. Hesse.—On fluorescence, by S. Lamansky.—On the law of heat-radiation and the absolute emission-power of glass, by L. Graetz.—On annealing of steel and measurement of its hardness, by V. Strouhal and C. Barus.—On the height of the atmosphere (continued), by A. Ritter.—Researches on the volume-constitution of liquid compounds, by H. Schröder.—On variations of the sea-surface by reason of geological changes, by K. Zöppritz.—On the theory of Volta's fundamental experiment, by F. Exner.—The theory of the galvanic element, by the same.—Note on the quantities of heat carried away by currents of an unequally heated liquid, by A. Oberbeck.—Note on Herr Siemens' recent paper on electric conductivity of carbon and temperature, by J. Borgmann.

No. 1, 1881.—New researches on Newton's rings, by L. Sohncke and A. Wangerin.—On vapour tension of homologous esters, by O. Schumann.—On the elasticity and the electric conductivity of carbon, by W. Beetz.—Thermal theory of the galvanic current, by J. L. Hoorweg.—On electric light phenomena in gases, by E. Goldstein.—On the phenomena of glow at metallic electrodes within a hydrogen atmosphere of varying pressure, by O. Lohse.—Note on Riecke's paper on the electric elementary laws, by H. Lorberg.—Clausius' law and the motion of the earth in space, by J. Fröhlich.—On the application of the proposition of the virial in the kinetic theory of gases, by H. A. Lorentz.—On the influence of expansion of molecules on the pressure of a gas, by D. J. Korteweg.—On the velocity of light in various quartz surfaces, by W. Hallock.—Reply to Herr Dorn, by E. Edlund.—On tones arising through intermittent radiation on a gas, by W. C. Röntgen.—On phenomena of diffraction before the border of a screen, by O. Tumlirz.

THE *Journal of Physiology*, vol. iii. No. 2, January, contains: Dr. S. H. Vines, on the proteid substances contained in the seeds of plants. To this important paper is appended a classification of aleurone grains and a classified list of the plants whose seeds were examined.—Dr. Sydney Ringer, the influence of season and of temperature on the action and on the antagonisms of drugs.—Dr. C. S. Roy, the elastic properties of the arterial wall, with plates v.-vii.—Dr. J. Ott, on crossed hyperæsthesia, and notes on inhibition.

Journal of the Royal Microscopical Society, ser. ii. vol. i. part 1, February, contains: Dr. C. T. Hudson, on *Œcistes janus* and *Floscularia trifolium*, two new species of Rotifers (plates 1 and 2), and the usual summary of current researches relating to zoology and botany, microscopy, &c.—The minutes of the proceedings of the Society are given at the end of the part.

Journal of the Franklin Institute, February.—On the revolution of a fluid ellipsoid with three unequal axes, by T. Craig.—A newly-discovered property of the ellipse, and its application to the "oval chuck," by F. M. Leavitt.—A simple-transmission-dynamometer, by E. Thomson.—Methods for judging of the wholesomeness of drinking-water, by R. Haines.—The basic dephosphorising process, by J. Reece.—Riehla Brothers' improved vertical testing machine, 50,000 pounds capacity.

THE *American Naturalist*, February, 1881.—L. F. Ward, incomplete adaptation as illustrated by the history of sex in plants.—Sarah P. Monks, a partial biography of the green lizard.—G. K. Morris, a new leaf-cutting ant.—S. V. Clevenger, comparative neurology (continued).—Justin Spaulding, the bee's tongue, and glands connected with it.—Wm. E. Doyle, history of the buffalo.

Revue Internationale des Sciences biologiques, January 15, 1881.—Prof. Hanstein, protoplasm considered as the basis of animal and vegetable life.—D. Debierre, an introduction to the earth's history.—Ch. Letourneau, the ethics of egoism (Schopenhauer's "Aphorisms on Moderation in Life").—J. L. de Lanessan, digestion in vegetables.

The Proceedings of the Linnean Society of New South Wales, vol. iv. part 4, Sydney, 1880.—John Brazier, synonomy of, and remarks upon, Port Jackson, New Caledonian, and other shells, with their distribution; list of land-shells found on Thursday Island, with description of new species; Port Jackson and New South Wales brachiopods; mollusca recently dredged at Port Jackson Heads; on the locality of *Oniscia ponderosa*.—E. P. Ramsay, on an undetermined species of Lalage; contribution to the zoology of New Guinea, part 6.—W. A. Haswell, supplementary note on Australian Leucosiidæ; on Australian *Brachyura Oxyrhyncha*, plates 25, 27.—C. Jenkins, on the geology of Yass Plains (3).—W. Macleay, on the Mugilidæ of Australia.—C. S. Wilkinson, on the Abercrombie caves.

Journal of the Asiatic Society of Bengal, vol. xlix. part 2, No. 2, August 30, 1880, contains:—Alexander Pedler, on the past and present water supplies of Calcutta.—R. Lydekker, on the zoological affinities of the bharal or blue sheep of Tibet. While forming a very closely connecting link between the sheep and the goat; the author thinks it cannot be referred to either of the genera Ovis or Capra, and that Hodgson's genus Pseudovis should be retained for its reception.—J. Wood-Mason, on a new butterfly (*Hebomoia Roepstorfii*) from South Andaman, near *H. sulphurea*, Wallace.

Journal de Physique, February.—On radiophony, by E. Mercadier.—Researches on the differences of potential of two metals in contact; results, by H. Pellat.—Dr. Cusco's lens with variable focus, by C. M. Gariel.—On the correction of cooling in calorimetry, by M. Berthelot.—Edelmann's universal support for physical experiments, by A. Terquem.

SOCIETIES AND ACADEMIES

LONDON

Zoological Society, March 1.—Prof. W. H. Flower, F.R.S., president, in the chair.—The Secretary exhibited the cast integument of a large spider (*Mygale bistriata?*) which had been shed in the Society's Gardens.—Mr. G. E. Dobson, C.M.Z.S., read a paper on the anatomy of the family *Erinaceidæ*, commencing with that of the curious and rare form *Gymnura Rafflesii*, with which the species of *Erinaceus* were compared. *Gymnura* was shown to be a peculiarly central form, the survivor probably of a once widely-spread group. Altogether the anatomy of thirteen species of Erinaceidæ was treated of in this paper.—A communication was read from Mr. F. Moore, F.Z.S., containing the descriptions of some new genera and species of Asiatic nocturnal lepidoptera. The characters of 150 new species were given, representing eighty-two genera, of which twenty-nine were new to science.—A communication was read from Mr. R. Collett, C.M.Z.S., containing an account of the breeding habits of the grey seal (*Halichoerus grypus*), as observed on the Fro Islands, off Trondhjem's Fiord, in Norway.—Mr. R. Bowdler Sharpe, F.Z.S., read a note on the fantail flycatcher of Western Australia (*Rhipidura presssi*), of which he had lately had for the first time an opportunity of examining a specimen.

Geological Society, February 23.—Robert Etheridge, F.R.S., president, in the chair.—William Henry Goss was elected a Fellow of the Society.—The following communications were read:—A letter from Dr. John Kirk, communicated to the Society by the Right Hon. Earl Granville, dated H.M. Agency and Consulate General, Zanzibar, December 20, 1880. "It may be of interest to record the occurrence here of an earthquake shock felt in the island of Zanzibar at 6.58 a.m., mean time, on the morning of the 18th inst. Although the shock was very distinct no damage appears to have been done to any buildings in town. It is now twenty-four years since a similar shock has been here noticed; but on the mainland, espe-

cially in the vicinity of Ujiji, they are both more common and more severe than at the coast. Shortly after the cable was laid between Mozambique and Delagoa Bay, the communication was suddenly interrupted after one of these earthquake shocks, which seems to have caused the falling in of rocks by which the cable was crushed."—The Permian, Triassic, and Liassic rocks of the Carlisle Basin, by T. V. Holmes, F.G.S. The district discussed in the author's paper was worked over by him when engaged on the geological survey, and consists of those parts of Cumberland and Dumfriesshire which adjoin the Solway. Its southern boundary is, approximately, a line ranging from Maryport to Rose Castle on the River Caldew, and touching the Eden about two miles above Wetheral. On the east and north-east its limits are the immediate neighbourhoods of the junction of the rivers Eden and Irthing, Hethersgill on the Hether Burn, Brackenhill Tower on the Line, and the border boundary on the Rivers Esk and Sark; and in Dumfriesshire the small tract south of a line ranging from the junction of Scots Dyke with the Sark on the north-east, to Cummertrees on the south-west. The lowest bed in this area is the great Upper Permian or St. Bees Sandstone, which occupies a belt of country in the neighbourhood of the outer boundary. Directly above St. Bees Sandstone, in the west of the district, lies a formation consisting of shales with gypsum, which, though 700 feet thick in the neighbourhood of Abbey Town, is nowhere visible, but is known solely from borings, the country west of the Caldew, and of the Eden below the junction of the two streams, being thickly drift-covered and almost sectionless. In the east of the district the St. Bees Sandstone is overlain directly by a soft, red, false-bedded sandstone, called by the author Kirklinton Sandstone, from the locality in which the rock is best seen, as well as its relations to the under- and overlying beds. But while there is no evidence of any unconformity between the St. Bees Sandstone and the overlying Gypseous Shales in the west, there is evidence of a decided unconformity between the St. Bees and Kirklinton Sandstones in the east. In Carwinley Burn (for example), which runs into the Esk at Netherby, only from 200 to 300 feet of St. Bees Stone was seen below the outcrop of the Kirklinton, instead of the 1000 to 1500 feet which probably exist about Brampton on the one hand, and in Dumfriesshire on the other. Yet Carwinley Burn affords an almost continuous series of sections, from the (non-faulted) Permian-Carboniferous junction to some distance above the outcrop of the Kirklinton Sandstone. As, in addition, the shales underlying the St. Bees Sandstone are gypseous, both near Carlisle and at Barrowmouth, close to St. Bees Head, the author classed the (Upper) Gypseous Shales as Permian, and the Kirklinton Sandstone as Bunter. Resting unconformably on the Kirklinton Sandstone, in the district between Carlisle and Kirklinton, are the Marls seen on the Eden, between Stanwix and Beaumont, and on the line between Westlinton and Cliff Bridge, Kirklinton. Their unconformity is shown by the fact that on the line they rest on the lower, or red, beds, and between Stanwix and Beaumont on the upper, or white, beds of the Kirklinton Sandstone. The Marls have therefore been classed as Keuper. So far as the evidence goes they appear to be very thin, and to extend but a very small distance south of the Eden. Lastly, the Lias appeared to the author to be unconformable to all the beds below, and to rest partly on the Gypseous Shales, partly on the Kirklinton Sandstone, and partly on the Keuper Marls. Of the existence of Rhætic beds there was no evidence, all fossils hitherto found having been determined by Mr. Etheridge (the president) to be Lower-Lias forms. But the Lias-sections are so small and few in number, and the ground so persistently drift-covered, that only a boring could settle the question.—On *Astroconia Granti*, a new Lyssakine Hexactinellid from the Silurian formation of Canada, by Prof. W. J. Sollas, M.A., F.G.S. This paper contained a description of a new fossil Hexactinellid sponge from the Niagara chert beds of Hamilton, Ontario. It is the second oldest known example of the Lyssakina.

Anthropological Institute, February 8.—Major-General A. Pitt-Rivers, F.R.S., president, in the chair.—The election of the following new members was announced: A. G. Geoghegan, E. H. Man, Owen Roberts, and Bruno Müller.—Mr. W. L. Distant exhibited some Carib chisels from Barbadoes, which had been sent to him by Mr. W. J. Sollas, of Bristol. They were taken with about 100 more from a cave, and were found six or eight inches below the surface. The cave is about 350 feet above the sea level, and is situated at a distance of two miles from the coast.—Mr. A. L. Lewis read a paper on two stone circles in Shropshire. Between five and six miles west of Minsterly is a circle of small stones known as the "Hoarstone." The largest stone is in the centre and is surrounded by thirty-three stones and fragments arranged in a circle about 74 feet in diameter. About a mile and a half in a south-westerly direction from the Hoarstone is another circle called in Gough's "Camden's Britannia" "Madge's Pinfold." Here thirteen stones and three fragments stand and lie in an oval ring, the diameters of which are about 86 feet and 92 feet, the longest diameter running north-west and south-east.—Miss A. W. Buckland read a paper on surgery and superstition in neolithic times; the object of which was to bring before the Institute the frequent use of trepanning in Neolithic times, as proved by the late Dr. Broca; to call attention to the proofs he has given of the facts, and to his explanation of the reason of the practice, and of the superstitions associated with it, as also its connection with the use of cranial amulets.

Physical Society, February 26.—Prof. Fuller in the chair. The former resolution regarding the moneys of the Society for investment was adopted.—Dr. O. J. Lodge exhibited a mechanical apparatus illustrating the fact that conductors of electricity are opaque to light, and showed by means of a Wheatstone's photometer, which combines two circular motions into a harmonic one, how the plane of polarisation of a beam of light passing through a magnetic medium is rotated.—Mr. C. V. Boys exhibited his new integrating machine, which is the only one illustrative of the mathematical process of integration, and is therefore specially valuable for teaching purposes.—Mr. Shelford Bidwell read a paper on the telegraphic transmission of pictures of natural objects. The process is explained as follows:—The positive pole of a battery is connected through a set of resistance-coils to a piece of platinum wire, and the negative pole to a plate of zinc, upon which is placed a sheet of paper moistened with a solution of potassium iodide. The negative pole of a second battery is connected through a selenium cell with the same platinum wire, and the positive pole to the zinc plate. The point of the platinum wire is pressed upon the paper, and the selenium being exposed to a strong light, the variable resistance is so adjusted that the currents from the two batteries which pass through the paper in opposite directions exactly neutralise each other. The platinum point will now make no mark when drawn over the paper; but if the selenium is shaded, its resistance is immediately increased: the current from the first battery then predominates, and the path of the platinum point across the paper is marked by a brown line due to the liberation of iodine. The line is fainter the feebler the light is. This arrangement has been applied by Mr. Bidwell in his "telephotograph," exhibited to the meeting. The transmitter consists of a brass cylinder mounted on a screw spindle which carries the cylinder laterally $\frac{1}{64}$ inch at each revolution. A pin-hole in the middle of the cylinder allows light to fall upon a selenium cell placed behind it within the hollow cylinder. The cell is connected in circuit with a battery and the line. The receiver consists of a similar metal cylinder mounted so as to rotate synchronously with the first, and having a platinum point pressing upon a sheet of chemical paper wrapped round the cylinder. This receiver and transmitter are connected up as described above with two batteries and a set of resistance-coils. The image to be transmitted is focussed upon the cylinder of the transmitter and the resistance adjusted, and the receiving cylinder covered with sensitised paper. The two cylinders are caused to rotate synchronously, the pin-hole in the course of its spiral path covering successively every point of the focussed picture. The amount of light falling upon the selenium will be proportional to the illumination of that particular spot of the projected image which is for the time being occupied by the pin-hole, and the intensity of the line traced by the platinum point in the receiver will vary in the same proportion. These variations will produce a picture which, if the instrument were perfect, would be a counterpart of that projected upon the transmitter. Simple designs cut out of tin-foil and projected by a lantern have been successfully transmitted. With selenium and paper of greater sensitiveness more perfect results might undoubtedly be obtained.—Professors Ayrton and Perry showed an experiment illustrating their plan for sending light and shade images by electricity. A selenium cell was connected in circuit with a battery and a coil of wire surrounding a tube along which a beam of light passed. A shutter having a small magnet attached was suspended in the tube like a galvanometer mirror, so that when a current traversed

the coils the shutter was deflected so as to close or partially close the tube and shut off the beam of light. It will be understood that when a ray of light fell on the cell and diminished its resistance, the current in the coils would increase to a degree proportional to the intensity of the ray, and thus the shutter would proportionally cut off the light in the receiver. If now a number of these elementary circuits were combined so as to provide a mosaic of cells to transmit the reflected image of an object, and a screen to receive the corresponding beams of light controlled by the shutters at the other end of the line, there would be a means of sending light and shade images by wire. A rapidly rotating arm carrying a row of cells upon it might answer for a stationary mosaic transmitter, and need fewer cells, while a Japanese mirror having its curvature altered by electromagnets behind might be made to act as a receiver; the "magic" images of that mirror being due to inequalities of curvature. Prof. Ayrton agreed with Mr. Bidwell in his conclusion that selenium cells of high resistance were more sensitive to light than cells of low resistance. Dr. Coffin suggested that Mr. Bidwell should adopt other than the cylindrical form of receiver, and move an image of the object across the pin-hole. Prof. G. C. Foster advised bringing the light always on one and the same part of the selenium cell.

Quekett Microscopical Club, February 25.—T. C. White, president, in the chair.—Ten new Members were elected, and numerous donations received.—A communication was made by Mr. A. D. Michael, announcing the discovery by Mr. Beaulah of *Myobia musculi* upon a mole, this parasite having been previously regarded as one confined to mice. A discussion ensued as to the frequent errors in classification and nomenclature arising from insufficient observation.—The Rev. J. E. Fase exhibited and described a convenient form of grooving slide, which could be used either with high- or low-power objectives.

Institution of Civil Engineers, February 22.—Mr. Abernethy, F.R.S.E., president, in the chair.—The paper read was on the weight and limiting dimensions of girder bridges, by Mr. M. am Ende, Assoc. M. Inst. C.E.

EDINBURGH

Royal Society, February 7.—Prof. Maclagan, vice-president, in the chair.—After reading the obituary notices of Lord Ormidale, Dr. Sharpey, Mr. Lassell, and other deceased Fellows, the chairman called on Prof. George Forbes to communicate his paper on a simple and accurate method of determining the longitude of a place by a single observer without the aid of any instrument for measuring time. The method consisted in taking advantage of the daily change in the moon's declination, which for four or five days during each lunation was sufficiently rapid to be measured with considerable accuracy by means of a sextant and artificial horizon. The calculations and reductions were too intricate to be effected save by a method of approximation and interpolation such as that which the author had given in his paper.—Mr. J. Y. Buchanan read a short paper from Prof. Liversidge descriptive of a specimen of Stilbite that had been brought by the *Challenger* from Kerguelen's Island.—Prof. J. Blyth gave an interesting account of certain experiments which he had made with a simple form of selenium cell. Two ordinary metal combs with every alternate tooth broken away were set close together, so that each remaining tooth in either fitted without touching into the interstice between two remaining teeth in the other. The two combs were then brought into electrical contact by the selenium, which was poured in between the teeth; and thus a selenium cell was formed with a large surface and small resistance. In one special form of cell the combs were bent round a glass tube, inside which a singing flame was set. The accompanying rhythmic fluctuations in the luminosity of the flame were reproduced as sound in the telephone receiver. The difficulty of getting good selenium at the time induced the author to try if amorphous phosphorus would serve as a substitute. A "radial cell," in which the interstices between the dove-tailing electrodes were filled with phosphorus, was found to be not sensitive to light; but such an arrangement was discovered to be a battery in itself, giving rise to currents which varied with the pressure that was brought to bear upon the phosphorus. This property at once suggested a phosphorus cell as a possibly useful transmitter in a telephonic circuit. Another curious effect was noted, viz. that phosphorus under the action of a variable current glowed with a beautifully varying phosphorescence.—Mr. Aitken communicated further experiments on the formation of fogs. His former experiments he had repeated at as low temperatures as 8° F., invariably finding that in filtered air no fog formed. Discussing the production of dry fogs, *i.e.* fogs that are formed in *non-saturated* air, the author pointed out that certain kinds of fog-forming dust were much more efficient in their action than others. Some, in virtue probably of their deliquescent properties, formed clouds in non-saturated air; others only acted in saturated air; while a third class required the air to be super-saturated. In connection with the change of state of moisture in the atmosphere, Mr. Aitken explained the formation of the various forms of ice-crystals by application of the principle that the slower the crystallisation the more regular and simple it is. Hence complex types of crystals betoken a rapid crystallisation. The paper ended with a few instructive remarks upon liquid surface-tension as an important factor in the growth and coalescence of raindrops as they descend towards the earth.—Prof. Tait, in a short note on thermal conductivity, intimated that he had solved the equation for conduction, taking into account the temperature-variations of the conductivity and specific heat. He further pointed out that, at least in the case of iron, most of the decrease with temperature that apparently takes place in the value of the conductivity is in all likelihood referable at once to the change in specific heat; so that perhaps after all conductivity varies very slightly indeed with temperature, and is practically constant through ordinary ranges. Prof. Tait also gave a simple experimental illustration of the diminution in the surface-tension of water produced by heating. A red-hot poker was held close over a level water surface on which Lycopodium dust was sprinkled, when at once the dust was drawn away to cooler regions as if violently repelled by the strongly-heated metal.—Dr. Haycraft communicated a paper in which he showed that the hepatic cells of man and other domestic animals, several of which he had examined, are possessed of true cell-walls. These may be demonstrated by placing a few scrapings from a fresh organ on a slide, and pressing the cover-glass down so as to crush them. The membranes are then to be seen projecting from the half-broken cells, or scattered about the preparation.

BOSTON, MASS., U.S.A.

American Academy of Arts and Sciences, February 9.—The president, Prof. J. Lovering, in the chair.—Prof. H. P. Bowditch presented some observations on the senses of sight and touch. An observer having noticed the position of a point at the centre of a target, shut his eyes, and after a measured interval of time attempted to touch this point again. It was found that the attempts were more successful when two seconds had elapsed than in the cases when more or less time had intervened.—Mr. N. D. C. Hodges read a paper upon the thermodynamic basis for the kinetic theory of gases. By means of the fundamental equations of thermodynamics the mathematical analysis of the kinetic theory results at once; and an expression is obtained for the absolute mass of a molecule.—Prof. Pickering, in a paper on variable stars, discussed their changes in brilliancy and grouped them according to a new law.—Mr. Arthur Searle gave some of the results of his observations on the zodiacal light.—Mr. Harold Whiting, in an abstract of a forthcoming paper, stated that he had found the rate of propagation of what may be called the magnetic wave to vary from 30 feet to 300 feet per second.—Prof. Goss presented some observations on the strength of fir beams.

PARIS

Academy of Sciences, February 21.—M. Wurtz in the chair.—The following papers were read:—Meridian observations of small planets at Greenwich and Paris Observatories during the fourth quarter of 1880, communicated by M. Mouchez.—On the parallax of the sun, by M. Faye. He indicates in a table nine methods of determining the earth's distance from the sun. He holds that the method of physicists is best; that the sun's parallax, 8″·813, is now determined by them to within $\frac{1}{100}$ of a second; and that the seven astronomical methods converge more and more towards this result, and tend to confirm it, without having equal certainty.—Male eels, compared with the females, by M. Robin.—General considerations on the Crustacean fauna of great depths in the Carribbean Sea and the Gulf of Mexico, by M. Alph. Milne-Edwards. This deals with some results of the cruises in the *Blake*. Many new Crustacean species were obtained, and certain groups previously thought foreign to American waters were found abundantly at great depths. Anomouran and macrouran Crustacea there abound. Numerous forms intermediate between groups that have been thought very distinct are discovered (and the author cites several examples).—New clinical researches tending to prove that the cerebellum

is the co-ordinating nerve-centre for movements necessary to standing and walking, considered in all their forms, by M. Bouillaud.—On the systems of faults or diaclases which traverse the series of stratified formations; new examples furnished by Cretacean strata in the environs of Etretat and Dieppe, by M. Daubrée.—On Fuchsian functions, by M. Poincaré.—A letter of Ampère was presented.—On a class of Abelian integrals and on certain differential equations, by M. Picard.—On an integrator, or instrument for graphic integration, by M. Abdank-Abakanowicz.—On the cooling power of gases and vapours, by M. Witz. He infers equality of the cooling powers of dry air and air saturated with moisture. The cooling power of coal-gas compared with that of air is equal to 3·48, that of sulphurous acid does not exceed 0·61 (the pressure being 760 mm.). The velocities of cooling increase more quickly than the 1·233 power of the excesses. For steam they increase proportionally to the 0·83 power.—On the surfaces of revolution limiting liquids deprived of weight, by M. Terquem.—On radiophony: third note by M. Mercadier. He proves that the radiophonic effects are due to vibratory motion caused by alternate heating and cooling through intermittent radiations, principally in the gaseous layer adherent to the solid wall struck by these radiations; the anterior wall in opaque receivers, the posterior in transparent receivers.—Magic mirrors of silvered glass, by M. Laurent. He uses either pressed glass (polishing the surface opposite to the projections), or thin glass of commerce (engraving a hollow design on it).—On pyridic bases, by M. de Coninck.—On the hystolysis of the muscles of larva during the post-embryonic development of Diptera, by M. Viallanes. This relates to the phenomena of disappearance of muscles as the insect passes into the state of *pupa*.—On a new larva of Cestoïdes belonging to the type of the Cysticercus of Arion, by M. Villot.—On a new form of segmentary organ in Trematodes, by M. Macé.—Researches on the circulation and respiration of Ophiures, by M. Apostolidès. The circulatory system is formed of the general cavity and the spaces connected with it; and the respiratory sacs, by their alternate contraction and expansion, draw the blood into the peristomachal cavity, then drive it to the periphery. This explains how the sanguineous liquid, bathing all the organs, respires, and is set in motion.—On a method of coloration of Infusoria and anatomical elements during life, by M. Certes. Placed in a weak solution of chinoline blue, or cyanine, Infusoria take a pale blue colour, and may continue to live twenty-four to thirty-six hours. After twenty-four hours in a moist chamber, the white corpuscles of a frog's blood, coloured with cyanine (in serous solution) show amœboid movements. Chinoline blue is, *par excellence*, the reagent of fatty matter (which is quite absent in nuclei and nucleoli).—On the permanence of prussic acid during a month in the bodies of animals poisoned with this substance pure, by M. Brame. A rabbit and a cat were poisoned with 1 gramme of the substance each. In such dose it seems to preserve the animals perfectly at least a month, remaining in the tissues (especially those of the stomach), with which it seems to become intimately united.

February 28.—M. Wurtz in the chair.—The following papers were read:—On the attenuation of virus and its return to virulence, by MM. Pasteur, Chamberland, and Roux. The bacterium of *charbon* in artificial cultivation produces true germs (unlike the microbe of chicken cholera, which multiplies by division), whose virulence is not affected by air. This spore-production can be hindered by cultivation at 16° or at 42° to 43°. The mycelian product, in the latter case, becomes sterile after about a month; up to that point reproduction is easy, but the virulence is gone after the first eight days, in which time it passes through various stages of attenuation. The secret of causing a return of virulence consists in successive cultivation in the bodies of certain animals. The facts throw light on the etiology of epidemics.—Action of hydracids on halogen salts containing the same element, by M. Berthelot. Compounds so formed exist both in the case of alkaline salts, where they are denoted by absorption of gas, liberation of heat, and special reactions, and in the case of metallic salts properly so called, where they are obtained crystallised.—M. de Lesseps presented a fifth series of documents relating to the history of the Suez Canal.—On the disinfectant and anti-putrid action of vapours of nitrous ether, by M. Peyrusson. Its action is shown both from laboratory and hospital observations. It has the advantage of an agreeable and harmless smell.—On a new definition of the surface of waves, by M. Darboux.—On the development of the infinite product $(1-x)$, $(1-x^2)$ $(1-x^3)$ $(1-x^4)$ . . . by Mr. Franklin.—On radiophony, by M. Mercadier. He makes *thermophonic piles*, or *phonic thermomultipliers* (after the analogy of electric thermo-multipliers), for study of radiant heat, a single element consisting of a short glass tube containing a thin plate of smoked foil or mica, and several such being connected by caoutchouc or metal tubes. The air in these tubes vibrates longitudinally, and by lengthening them he gets *thermosonorous* pipes, having the same properties as ordinary sounding-pipes.—Application of Talbot's fringes to determination of the refractive indices of liquids, by M. Hurion.—On the displacement of the soda of chloride of sodium by hydrate of copper, by M. Tommasi. This takes place even at a low temperature (4° to 5°). With pure sodium chloride the reaction is almost instantaneous. Potassium chloride gives like results.—On the heats of combustion of some alcohols of the allylic series and of aldehydes which are isomeric with them, by M. Louguinine.—On the products of decomposition of proteic matters, by M. Blennard.—On a synthetic homologue of pelletierine, by M. Étard.—On a cause of alteration of canvas, by M. Balland. This relates to an observation by Dr. Tripier on some rusty-coloured hammock canvas used by the Algerian army in 1847. This showed dark spots after washing, and went to pieces in use. The spots were probably due to iron sulphide produced by alkaline sulphides in the artificial soda and by iron oxide fixed by the stuff in manufacture. The sulphide passed to the state of sulphate in air by a combustion involving the tissue.—Contribution to the study of trichinosis, by M. Chatin.—Contribution to the physiological action of urea and of ammoniacal salts, by MM. Richet and Moutard-Martin. *Inter alia*, it is singular that injection of a concentrated solution of urea increases the elimination of water more than of urea. In uremia death cannot be attributed to non-elimination of the ammoniacal salts of urine.—On the inflammatory nature of the lesions produced by the poison of the Bothrops serpent, by MM. Couty and De Lacerda.—On the pulmonary alterations produced by long stay in the purifying chambers of gas-works, by M. Poincaré. Animals kept eight months in those chambers showed in the lungs an accumulation of epithelial cells in some alveoli, but especially a prodigious nuclear proliferation in the connective tissue. This shows that it is not without danger to subject children with whooping-cough to similar treatment.—Relation of the cylinder axis and the peripheral nerve-cells with organs of sense in insects, by MM. Künckel and Gazagnaire. In insects every nervous enlargement consists essentially of a bipolar cell (true nerve-termination), connected on one hand with the cylinder axis of the nerve-fibre, and on the other with a nerve-rod which is its prolongation; this rod is surmounted by a hair properly so called, or a transformed hair.—On the gemmation of Pyrosoma, by M. Joliet.—Antiquity of *Elephas primigenius* (Blum) in the sub-Pyrenean Valley, by M. Caraven-Cachin. It seems to have appeared first after the diluvium of the plateaux on the old Pleistocene spread in a nearly horizontal sheet over Tertiary and other strata.

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