at right angles to its first position, the maximum velocity came nearer it, and had the cannon been pointed towards the membranes, the retardation would probably have become an acceleration.—Dr. Ihlseng has measured the velocity of sound in wood, both by Kundt's method and the graphic method, in which latter a blackened glass plate was drawn rapidly in a horizontal direction (across the direction of the rod's length), by a falling weight, and a pen attached to the rod wrote its vibration on the plate, which also registered those of a tuning-fork. This method was found one of considerable accuracy. Its results were slightly below those by Kundt's method, and (when the plate was moved in a different direction) it demonstrated the existence of transverse along with longitudinal, and gave their ratios.—Mr. Pumpelly writes on the relation of secular rock disintegration to loess, glacial drift, and rock basins; Mr. Fontaine continues his notes on the mesozoic strata of Virginia; and Mr. Hawes describes a group of dissimilar eruptive rocks in Compton, New Hampshire.—In a method of determining dip, devised by Mr. Hodges, a compound bar is used consisting of two joined at right angles at a point near their ends; when placed so that the two branches make equal angles with the line of dip, the two joined poles neutralise each other, and any needle suspended near that point is unaffected. A slight turning of the compound bar renders the field round the needle a north or a south, and the needle moves correspondingly.—Some notices of recent American earthquakes are furnished by Prof. Rockwood, Jun.

Journal de Physique, January.—This number opens with M. Joubert's researches on the rotatory power of quartz and its variations with the temperature; they prove that quartz constitutes a thermometer of extreme sensibility.—A new and simple regulator of velocity, for electric motors especially, described by M. Deprez, rests on the principle of centrifugal force acting on one end (loaded) of a flexible metallic strip, and (with a certain intensity) breaking contact of an adjusting screw at that end with a metallic piece, and so stopping a current which actuates the motor.—M. Witz studies the thermal effects of the walls of an inclosure on the gases it contains.—M. Pellat describes an apparatus for effecting the synthesis of compound colours, the very colours of the spectrum being taken in the desired proportions and mixed completely; and M. Schwedoff one for studying the vibratory movements of cords, the cord being set in motion by means of an electric trembler at one end.

THE *Sitzungsberichte der naturwissenschaftlichen Gesellschaft Isis in Dresden* (1878, part 1, January to July) contain the following papers of interest:—On Heligoland and Norderney from a geological point of view, by C. D. Carstens.—On the tertiary flora of the Klein Purberg near Czernowitz, by Herr Engelhardt.—On amber, by Dr. O. Schneider.—On the saltpetre and the guano from the Atakama Desert, by Herr Weis.—On fossil man, by Herr Engelhardt.—On some prehistoric remains discovered on the Hradischt in Bohemia, by W. Osborne.—On palm leaves, by Herr von Biedermann.—On the largest elm tree of Germany, by C. F. Seidel. The tree in question stands in the village of Schimsheim near the railway station of Armsheim in Rhenish Hessen, and measures 30 metres in height, its trunk 15·07 metres in circumference, while its age is estimated at close upon 600 years.—On the colour which a gas flame assumes in the vapour generated by a mixture of permanganate of potash and sulphuric acid, by Carl Bley.—On the formation of crude coralline and of resorcine-oxaleine, by Dr. Schmitt.—On the action of ethyl mercaptan on diazo-compounds, by the same.—On a curious occurrence of tape-worms, by Herr Ebert.—On a Chinese work on insects, by C. F. Seidel.—On the origin of organic life upon the earth, by Dr. Steil.—On the red gneiss near Freiberg in Saxony, by Dr. Geinitz.—On the natural history of the Caucasus countries, by Dr. Oscar Schneider.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 30.—"On the determination of the Rate of Vibration of Tuning Forks," by Herbert McLeod, F.C.S., and George Sydenham Clarke, Lieut. R.E. Communicated by Lord Rayleigh, F.R.S.

The paper contains a description of some experiments made with a view to determine the absolute pitch of tuning forks by means of a method proposed by the writers in a previous paper (*Proc.* Roy. Soc., 1877, xxvi. 162).

It commences with a description of the time-measurer adopted, consisting of a compensated pendulum, worked by electricity, the impulse being given by a driver depending for its action on gravity alone. The pendulum is arranged to give second contacts, driving a clock-wheel with sixty teeth. This wheel has a platinum pin giving minute contacts, but it is used merely as a switch, the circuit being closed by the pendulum itself. The current works a relay, and closes the circuit required.

The tuning-fork apparatus consists of a brass drum resting on friction-wheels, and driven by a weight and train. Uniformity of motion being of great importance, an air-regulator, consisting of a fan inclosed in the lower compartment of a cylindrical box, is employed. By means of a diaphragm and vanes the fan can be made to do more or less work by pumping air from the lower into the upper compartment. The fan spindle carries a pulley driven by a thread passing round the drum.

Round one end of the drum are wrapped strips of paper on which white equidistant lines have been so ruled that they are parallel to the axis of the drum when the strips are in position. The strip most frequently used has 486 lines round the complete circumference of the drum. Opposite this graduated strip is placed a microscope with its axis horizontal. In the substage is placed a 2″ objective, producing an image of the graduations at the focus of the object-glass of the instrument. At the common focus of the two lenses is placed the tuning-fork, the stem of which is held vertical in a vice. The fork is partially inclosed in a glass case, and is so adjusted that the image of one of its limbs seems to cut the image of the graduations at right angles. The fork is set in motion by a suspended double-bass bow. If, when the fork is in vibration the drum is made to rotate with such a velocity that one of the graduations passes over the interval between two adjacent graduations in the time of one vibration of the fork, a stationary wave is seen of length equal to the length of that interval. To determine the number of vibrations of the fork in a given time, it is only necessary, therefore, to be able to count the number of graduations which pass in that period. As a perfectly uniform rotation has not been obtained, a regulator under the control of the operator is employed. This consists merely of a piece of string which passes round the axis of the drum, and also round a pulley which can be turned by the operator's left hand. An upward or downward motion of the wave denotes that the drum is going too fast or too slow, and by means of the pulley a gentle check or acceleration sufficient to keep the wave steady is given to the drum.

An electric counter gives the number of complete revolutions accomplished by the drum in any given period, and a fine-pointed tube, containing magenta, is carried by a saddle above the drum, and being actuated by an electro-magnet, makes a dot on a piece of white paper wrapped round the drum at the beginning and end of the experiment. The distance apart of these dots gives the additional fraction of a revolution accomplished by the drum during the period of the experiment. Electric circuits are so arranged that a reverser turned a few seconds before the minute at which it is intended to begin the experiment, causes a current to be sent exactly at that minute by the clock relay, which starts the electric counter, and also makes a dot on the drum. Just before the expiration of the last minute of the experiment the reverser is turned in the opposite direction, and at the expiration of that minute the counter is stopped, and a second mark made on the drum.

Some of the results obtained with different forks are given.

The results of further experiments made to determine the effect of temperature, of continuous and intermittent bowing, and of the mode of fixing the fork are appended.

An optical method by which two slightly dissonant forks may be compared without altering the period of either, is described.

Figures and diagrams fully explaining the apparatus employed accompany the paper.

February 13.—"Note on the Development of the Olfactory Nerve and Olfactory Organ of Vertebrates." By A. Milnes Marshall, M.A., D.Sc., Fellow of St. John's College, Cambridge. Communicated by W. S. Savory, F.R.S., Surgeon to, and Lecturer on Surgery at, St. Bartholomew's Hospital.

In the course of an investigation into the development of the cranial nerves of the chick, certain facts came to light indicating that the olfactory nerve, instead of being, as usually described, a structure differing totally in its mode of origin from all the other nerves in the body, in reality "exactly corresponds in mode of development with the other cranial nerves, and with the posterior roots of the spinal nerves."[1]

[1] *Proc.* Roy. Soc, March 8, 1877, p. 50, and *Quarterly Journal of Microscopical Science*, January, 1878, pp. 17-23.

The present paper contains the results of further investigations on this point; it deals also with some features in the development of the vertebrate olfactory organ, and with certain questions of a more general nature affected by the conclusions arrived at.

The Development of the Olfactory Nerve

The olfactory nerve of an adult vertebrate is usually described as consisting of three parts—a proximal *tractus olfactorius*, an intermediate *bulbus olfactorius*, and a distal *nervus olfactorius*, connecting the bulb with the olfactory organ. Of these parts the two former are commonly said to arise as a hollow diverticulum of the cerebral hemisphere—the so-called olfactory vesicle or olfactory lobe. The third part, the *nervus olfactorius*, is described as arising at a later stage either from the olfactory lobe, from the olfactory organ, or from the intervening mesoblast. In consequence of these peculiarities in its mode of development, the olfactory nerve is said not to bear the slightest resemblance to the other cranial nerve, and to be in no way comparable with them. Dr. Marshall, however, finds, from an examination of a large number of vertebrate embryos—chick, dogfish, salmon, trout, axolotl, frog, and lizard—that the *nervus olfactorius* is the first part to be developed; that it arises at the same time as the other cranial nerves and in the same manner; that it appears before the cerebral hemispheres, and consequently arises from the original fore-brain. He finds further that there is no trace whatever of an olfactory vesicle in the chick till the end of the seventh day, or in the dogfish till stage O of Balfour's nomenclature; in the salmon and trout there is no trace of an olfactory vesicle up to the time of hatching, nor indeed, for some time afterwards. Mr. Marshall maintains that the olfactory vesicle must therefore be regarded as a structure of merely secondary importance; and that the olfactory nerves, since in their early stage they do not differ embryologically in any respect from the segmental cranial nerves, must be regarded as the first or most anterior pair of true segmental nerves.

The Development of the Olfactory Organ

This will, in the absence of figure, be treated very briefly; those points only being noticed which are of special interest in connection with the conclusions arrived at in the preceding part of the paper.

The olfactory pits appear at almost the same time as the visceral clefts; or, to speak more accurately, they first become conspicuous objects at, or very shortly after, the time when the anterior visceral clefts become open to the exterior. This occurs about stage K in the dogfish, and about the fiftieth hour in the chick.

In their early stages the olfactory pits present a striking resemblance to the visceral clefts in position, shape, size, and general relations; their external apertures elongate and become slit-like, and the direction of the slit, like that of the visceral clefts, is at right angles to the longitudinal axis of the head. These facts are best illustrated by the study of whole embryos, and of longitudinal vertical sections.[1] They come out with great clearness in all the types of vertebrates examined, but with especial distinctness in the axolotl and salmon.

The development of the Schneiderian folds presents several points of great interest, which can be most favourably studied in the elasmobranchs. Attention has already been directed by Balfour[2] to the very early appearance of these folds. The important point, so far as the present question is concerned, is that these Schneiderian folds appear at the same time as, or very shortly after, the first rudiments of the gills. In addition to this identity in time, there is also identity in structure; in both cases development consists in the formation of a series of equal, closely apposed folds, mainly epithelial, but involving the underlying mesoblast to a certain extent. These folds are in the two cases—gills and Schneiderian folds—of the same width, the same distance apart, have epithelium of the same thickness and same histological character, involve the mesoblast to exactly the same extent, and in exactly the same manner; in a word, are structurally identical.

In the later stages the Schneiderian folds, like the gills, receive a very abundant supply of blood-vessels; and the relations of these vessels to the folds, which are very peculiar and characteristic, are identical in the two cases. Even in the adult elasmobranch there is a remarkable histological resemblance between the gills and the nose.

The facts above recorded concerning the development of the olfactory nerve and olfactory organ point towards the same conclusions as to the morphology of these structures, viz., that the olfactory organ is a visceral cleft; that the olfactory nerve is the segmental nerve supplying that cleft in a manner precisely similar to that in which the hinder clefts are supplied by their respective nerves; and that the Schneiderian folds are gills.[1]

These conclusions, if accepted, will considerably simplify our conception of the segmentation of the vertebrate head. As there are no nerves or clefts in front of the olfactory segment, the olfactory nerve must be taken as the most anterior nerve, and the nose as the most anterior cleft. The next cleft is that in front of the maxillo-palatine arch, of which a part probably persists in the adult as the lachrymal duct: the segmental nerve corresponding to this cleft is the *third*, or oculomotor nerve. Next comes the mouth cleft, supplied by the *fifth*, or trigeminal nerve; and then in succession the clefts supplied by the facial, glossopharyngeal, and pneumogastric nerves. This view of the constitution of the vertebrate head is found to accord well with the later researches of Prof. Parker on the morphology of the skeletal elements of the head.

Some at least of the labial cartilages will probably prove, on this view, to be homologues of the extrabranchials, a comparison that has already been made by Prof. Parker.[2]

If the olfactory organs are visceral clefts, they must originally have communicated with the mouth cavity. Indications of a former connection of this kind are by no means wanting; thus in salmon embryos the alimentary canal extends forwards, so as to underlie the nasal sacs; as development proceeds, this anterior prolongation of the mouth cavity gradually shrinks; it persists for a short time as a pair of cæcal diverticula, which ultimately disappear altogether.

In conclusion, it may be noted that the Schneiderian folds afford an instance, on the theory here maintained, of structures originally hypoblastic in nature becoming, from changed circumstances, epiblastic.

"On an Extension of the Phenomena discovered by Dr. Kerr and described by him under the title of 'A New Relation between Electricity and Light.'" By J. E. H. Gordon, B.A., Assistant Secretary of the British Association. Communicated by Prof. Tyndall, F.R.S.

In November, 1875, Dr. Kerr announced in the *Philosophical Magazine*, that he had discovered a new relation between electricity and light. He showed that when glass is subjected to an intense electrostatic stress that a strain is produced which causes the glass to act like a crystal upon polarised light.

On Wednesday, February 5, 1879, I was working at this experiment in the Royal Institution, and endeavouring, by means of the electric light, to project the effect on a screen, in preparation for a lecture on the next day.

In the experiment as described by Dr. Kerr, and which was shown plainly on the screen, on February 6, the light is extinguished by the Nicols, and reappears when the coil is set going.

In the projection experiment a patch of moderately bright white light, about 3 inches diameter, appeared on the screen when the coil was worked. The images of the points inside the glass were about 1½ inches apart. On Wednesday, however, the electrostatic stress was accidentally allowed to become strong enough to perforate the glass. Immediately before perforation there occurred the effects which are the subject of the present communication.

First appeared a patch of orange-brown light about six or seven inches diameter. This at once resolved itself into a series of four or five irregular concentric rings dark and orange-brown, the outer one being perhaps fourteen inches diameter. In about two seconds more these vanished and were succeeded by a huge black cross about three feet across, seen on a faintly luminous ground. The arms of the cross were along the planes of polarisation, and therefore (the experiment being arranged according to Dr. Kerr's directions) were at 45° to the line of stress.

The glass then gave way, and all the phenomena disappeared except the extreme ends of the cross, and the discharge through the hole, where the glass had been perforated, was alone seen.

The phenomena were seen by Mr. Cottrell, by Mr. Valter (the second assistant), and by myself. A fresh glass plate was

[1] For figures of whole embryos illustrating the points referred, *vide* Parker, "On the Structure and Development of the Skull in Sharks and Skates," *Trans.* Zool. Soc., vol. x. part iv., 1878; Pl. 25, Fig. 1; Pl. 39, Figs. 1 and 2; Pl. 40, Fig. 1; and Balfour, *op. cit.*, Pl. 7, Stage L.

[2] *Op. cit.*, p. 184, and Pl. 44, Fig. 14.

[1] Cf. Dohrn, "Ursprung der Wirbelthiere," p. 23.

[2] *Proc. Zool. Soc.*, vol. x. part v., 1878, p. 212.

at once drilled in hopes of repeating the phenomena in the lecture next day, but owing to sparks springing round we did not succeed in perforating the glass, and therefore saw only the faint return of light described by Dr. Kerr.

Some more glasses have been prepared and their terminals insulated, and I now propose to make another attempt to repeat the new effects before the Royal Society.

Zoological Society, February 18.—Prof. W. H. Flower, F.R.S., president, in the chair.—The Secretary exhibited, on behalf of the Rev. T. O. Morris, an example of *Bombyx quercûs* with malformed antennæ.—Mr. Sclater exhibited a new humming bird from Northern Peru, which he had received for identification from M. L. Taczanowski, C.M.Z.S., and which he proposed to name *Thaumatius taczanowskii*.—Mr. Sclater exhibited a living amphisbænian (*Bronia brasiliana*) lately received by the Society from Monte Video.—A communication was read from Mr. E. L. Layard, C.M.G., F.Z.S., containing a note on *Pachycephala icteroides*, Peale, with the description of a supposed new species of the genus from Ovalau, Fiji group, proposed to be called *P. neglecta*.—A communication was read from Dr. A. Günther, F.R.S., containing a description of four new species of chameleons from Madagascar, proposed to be called *Ch. malphe*, *Ch. brevicornis*, *Ch. gularis*, and *Ch. globifer*.—A communication was read from Mr. Edgar A. Smith, F.Z.S., containing a description of a large collection of mollusca from Japan, formed by Capt. H. C. St. John, R.N., of H.M.S. *Sylvia*.—Messrs. Godman and Salvin read descriptions of a number of new species of butterflies from Central and South America.—A second communication from the same authors gave an account of a collection of butterflies made by the Rev. G. Brown in New Ireland and New Britain.—Mr. A. G. Butler gave an account of the Heterocera contained in a collection from the same locality.—A communication was read from Mr. W. A. Forbes on the systematic position of the genus *Lathamus*, in which, from a study of its pterylosis, osteology, and other points in its external and internal structure, he showed that this parrot must be referred to the neighbourhood of the *Platycercidæ*.—Mr. R. Bowdler Sharpe read a note on *Heliodilus soumagnei*, Grandidier, of which a specimen had recently been acquired by the British Museum.—Mr. Sharpe likewise pointed out the characters of a second species of the genus *Dromæocercus*, from Madagascar, proposed to be called *D. seebohmi*.—A communication was read from Mr. A. Boucard, C.M.Z.S., containing descriptions of two supposed new species of South American birds.—Dr. F. Day read some remarks on the occurrence at Southend of the little gurnard, *Trigla pœciloptera*.

Meteorological Society, February 19.—Mr. C. Greaves, president, in the chair.—Eleven new Fellows were elected and thirteen candidates proposed.—The following papers were read:—Diurnal variations of barometric pressure in the British Isles, by Frederick Chambers. The object of this paper is to show that differences of types of the diurnal variations of pressure at inland or sea-coast stations are due to the superposition, on a common type of diurnal variation at all the stations, of a distinct diurnal variation of barometric pressure, such as is required to satisfy the convection-current theory which explains the well-known diurnal land and sea breezes. To show this, all that is necessary is to take the differences of the corresponding hourly inequalities of the barometric pressure at pairs of inland and coast stations, and to exhibit these differences in the form of curves, which are then found to closely resemble the curves of diurnal variation of air temperature.—On a standard cistern siphon barometer, by Frederick Bogen.—On the relation existing between the duration of sunshine, the amount of solar radiation, and the temperature indicated by the black bulb thermometer in vacuo, by G. M. Whipple, B.Sc., F.R.A.S. The author has instituted a comparison between the duration of sunshine, as determined by Campbell's sunshine recorder, and the amount of solar radiation, as ascertained from the readings of the black bulb thermometer in vacuo, for the year 1877, at the Kew Observatory. It is evident that there is a close relation between these phenomena, but owing to the great range of the black bulb thermometer, the exact nature of the connection is not immediately evident. The author says that it may be safely concluded that the measure of solar radiation as given by the black bulb thermometer is only to be considered at any place as an indication of the relative presence or absence of cloud from the sky at the locality, and so its use as a meteorological instrument may with advantage be set aside in favour of the sunshine record, which has not the elements of uncertainty attached to it, inseparable from the former instrument.—Results of meteorological observations made at Buenos Ayres, by William B. Tripp, Assoc. Inst. C.E.

Anthropological Institute, February 11.—Prof. W. H. Flower, LL.D., F.R.S., vice-president, in the chair.—The election of Sir Henry Sumner Maine, K.C.S.I., LL.D., F.R.S., as a Member, was announced.—Prof. W. H. Flower, LL.D., F.R.S., exhibited and described a scaphocephalic cranium from Fiji, and Mr. A. L. Lewis exhibited a series of implements and photographs from Australia.—Mr. John E. Price read a paper on the Australian Aborigines, by Mr. D. Macallister. After describing their social and domestic observances, traditions, and religious notions, the author concluded that he had no doubt that had the continent of Australia remained undiscovered by Europeans for a few thousand years longer, the climatic and general physical changes which would doubtless have occurred, together with the contact at intervals with their more civilised Polynesian neighbours, would have constituted an environment more favourable to progress than any which has ever existed, and would have tended to an improved condition of the people. As it was, the total absence from the continent of ferocious or powerful animals, the comparative ease with which the poor and limited quantity of their food was obtained, and their national isolation, may have been a patent cause for the non-progressive character of the people.—The director also read a paper by Capt. W. E. Armit, F.L.S., on the customs of Australian Aborigines.

Entomological Society, February 5.—Sir John Lubbock, Bart., V.P.R.S., president, in the chair.—Messrs. H. W. Bates, J. W. Dunning, and F. Smith, were nominated vice-presidents for the ensuing year.—Mr. H. J. Elwes exhibited a collection of lepidoptera from a small island at the mouth of the River Amur.—Mr. Waterhouse exhibited a remarkable spider from West Africa, *Gasteracantha Cambridgei*, Butt.—A specimen of *Harpalus oblonguisculus*, taken at Weymouth, was exhibited by Mr. Champion.—The Rev. A. E. Eaton remarked on the peculiarities in the neuration of the wings of most of the *Ephemeridæ*, and exhibited drawings of wings of *Trichoptera* and *Tincina*, to show the homologies in the neuration of the same.—The Secretary read a note from Dr. Fritz Müller, recording a remarkable case of mimicry in the Brazilian butterfly, *Eueides pavana*, which mimics *Acræa thalia*. It is, however, in the male sex of *E. pavana* that the greatest resemblance to the *Acræa* is found.—The following papers were also communicated: On the lepidoptera of the Amazons, &c., Part iii., Noctuites, by A. G. Butler.—Description of a new genus of rhyncophorous coleoptera, &c., by C. O. Waterhouse; and descriptions of the species of the lepidopterous genus Kallima, by F. Moore.

Institution of Civil Engineers, February 18.—Mr. Brunlees, vice-president, in the chair.—The paper read was on the construction of heavy ordnance, by Mr. J. A. Longridge, M. Inst. C.E.

BOSTON

Society of Natural History, May 15, 1878.—The Devonian brachiopoda of the Province of Para, Brazil, by R. Rathbun, late assistant geologist to the Geological Commission of Brazil.

PHILADELPHIA

Academy of Natural Sicences, November 5, 1878.—Descriptions of Ichneumonidæ, chiefly from the Pacific slope of the United States and British North America, by E. T. Cresson.

November 12.—Descriptions of a new species of Delabella from the Gulf of California, with remarks on other species, by R. E. C. Stearns.

November 26.—On the structure of the gorilla, by Dr. Chapman, dealing with the muscles of the extremities as found in a male of two years old.

BERLIN

Chemical Society, February 10.—At the close of Prof. Kopp's remarks (see p. 387), Herr Frank exhibited a mass of infusorial earth saturated with bromine. As this form of silica will take up eight or ten times its own weight of bromine, he claimed that this would be a convenient form of handling, weighing, and using this corrosive liquid. The speaker also stated that he had found petroleum to be a specific for the burns and stains of bromine.—Herr Baumann then exhibited a specimen of hydroquinon found in the form of hydroquinon-sulpho acid in

the urine of a dog poisoned with carbolic acid. This remarkable conversion, in the system, of a mono-phenol into a di-phenol, was less remarkable than the statement of the speaker that he had also found a compound of paracressol in the urine of a horse, where it had been produced from the ordinary food.

VIENNA

Imperial Academy of Sciences, December 19, 1878.—The following, among other papers, were read:—Explanations of some orographic and topographic details of European Turkey, not rightly understood by geographers hitherto, by Dr. Boué.—Preliminary remarks on the formation of rational plane curves on one another, by Dr. Weyr.—Researches on the relations of nutritive matters to the transpiration of plants (second series), by Dr. Burgerstein.—On some chemical constants, by Prof. Peschka.—The theory of electrotonus, by Dr. Fleischl.—On the orbit of the planet (153) Hilda, by Herr Kühnert.

January 9.—Critical researches on the species of the natural family of *Cervi* (concluded), by Dr. Fitzinger.—On direct muscle-excitation with the muscle-current, by Prof. Hering.—On the magnetic behaviour of pulverised iron, by Prof. Waltenhofen.—Spectroscopic researches, by Herr Ciamician.—Determination of coefficients of elasticity from bending of a bar, by Prof. Pscheidl.—On a new water-wheel, by Herr Kersovini.—On a new problem of ballistics, by Dr. Simony.—The daily period of the velocity and direction of the wind, by Dr. Hann.—On the action of nitrous acid anhydride on protocatechuic acid, by Dr. Gruber.

January 16.—Natural history of the Flagellata (the third part of a work on Infusoria), by Prof. Ritter v. Stein.—On Dr. Rosicky's experiments with Geissler tubes, by Prof. Mach.—On the summation of stimuli by the heart, by Prof. Ritter v. Basch.—On condensation-products of gallus acid, by Prof. Oser and Herr Böcker.—Report on the results of investigations and excavations by the prehistoric commission during the past year.

PARIS

Academy of Sciences, February 17.—M. Daubrée in the chair.—The following papers were read:—Meridian observations of small planets at the Greenwich and Paris Observatories during the fourth quarter of 1878, communicated by M. Mouchez.—Determination of the coefficient of elasticity of different substances and of their limit of elasticity, by M. Phillips. The method suggested is based, like a previous one, on the theory of a regulator spring, but the influence due to inertia of the spring is suppressed. The coefficient of M. Deville's new alloy of iridium is given.—New researches on electric fish; characters of the discharge of the gymnotus; effects of a torpedo's discharge sent through a telephone, by M. Marey. He finds the discharge of the gymnotus pretty similar to that of the torpedo, and it is similarly affected by temperature. Using the telephone, a gentle excitation of a torpedo produces a short croaking sound, each of the small discharges consisting of only a dozen fluxes, and lasting hardly $\frac{1}{15}$th of a second. But the sound from a prolonged discharge, caused by pricking the electric lobe of the brain, lasts three or four seconds, and is a kind of moan, the tonality being near *mi*, (165 vibrations).—On the project of the interior sea in Algeria, by M. Favé. The topographic levellings at Suez, on land, comparable to that of Sahara, were proved (M. Favé urges) to have sufficient exactness.—Does the didymium of samarskite differ from that of cerite? by M. Lecoq de Boisbaudran. Both, he finds, give the same three blue lines.—New spectral lines observed in substances extracted from samarskite, by the same. He finds new lines or bands (not described by MM. Delafontaine, &c.), both of emission and absorption, which correspond together (at least the principal), and belong apparently to some new body. He expresses high admiration of Prof. L. Smith's generosity in distributing to chemists in France and America, rare and arduously elaborated products which he had not completed the examination of.—On the measures taken by the Sanitary Intendance of Marseilles, in the fear of invasion by the plague, by M. de Lesseps. He argues that it is foolish and useless to hamper the commerce of Marseilles with quarantine, &c., as the disease is not contagious but infectious, spreading by emanations carried by the air; and it would not be likely to attack such a town. He points out that the plague in Lower Egypt in 1834-5 did not spread to Upper Egypt, though the communications were not interrupted. M. Bouley contended that where the plague had appeared in Western Europe, it had come by diseased persons or objects in contact with them. M. D'Abbadie thought M. Bouley too absolute in asserting that the Oriental plague always spread by contagion.—On the Foucault's top transformed into a gyroscopic pendulum, by M. Gruey.—On the determination of the number of double points of a space defined by algebraic conditions, by M. Saltel.—Application of the direct potentials of Lamé to calculation of the equilibrium of elasticity of an isotropic and indefinite homogeneous solid, solicited in a finite extent by any exterior forces, by M. Boussinesq.—On unequal propagation of light polarised circularly in bodies submitted to the action of magnetism, according to the nature of the magnetisation and the direction of the luminous vibrations, by M. Becquerel. The fact here stated he demonstrated experimentally. The displacement of interference fringes under the magnetic influence, was the criterion employed.—Researches on the compressibility of gases at high pressures, by M. Amagat. The method (in which a deep pit is resorted to has been already described. Under a pressure of 430 atmospheres (the greatest reached), the volume of nitrogen is nearly a fourth greater than that deduced from Mariotte's law; this corresponds to a difference of nearly 100 ctm. in the pressure necessary to get the reduction of volume deduced from this law.—Note on the phenomenon observed by M. Duter, by M. Korteweg.—Improvements in Harrison's electric lamp, by M. Ducretet. Apparatus inclosed in the supporting case regulates automatically the consumption of the carbons and keeps the luminous arc constant.—On the relations which unite tetric and oxytetric acids and their homologues to succinyle, malyle, and other radicals of bibasic acids, by M. Demarçay.—Bromocitraconic acid, by M. Bourgoin.—On the respiratory innervation in the poulpe, by M. Fredericq. The integrity of visceral nerves, the subœsophagean masses, and the palleate nerves, seem alone indispensable to normal production of respiratory movements.—On the functions of the ganglionic chain in decapod crustaceans, by M. Yung.—On the existence of Saigas in France in the age of the reindeer, by M. Gaudry. M. Lartet, several years ago, announced the discovery of horns of the animal, but thought these had been brought as arms by a strange people. Jaw-bones and bones of the limbs have now been found.—Geological study of strata traversed by a tunnel of 14,400 metres, for directly connecting the Fuveau basin of lignite with the sea, by M. Dieulafait.

CONTENTS