circulation of the blood, by Messrs. Em. Legros and Griffé. From experiments made on the dog, cat, horse, pig, sheep, rabbit, and other animals, Magendie's dictum that pressure is diminished during inspiration and increased during expiration appears to be normally true in the case of the pig alone.—On the existence and cause of a monthly periodicity of the aurora borealis, by M. Terby. The paper is accompanied by a table of magnetic disturbances at Brussels during the years 1870-82 arranged in monthly decades. The existence of a monthly periodicity is demonstrated, and from a series of remarkable coincidences it is suggested that in this periodicity is reflected the duration of the rotation of the sun round its axis. It is further argued that the magnetic perturbations accompanying the aurora borealis, which are closely associated with the appearance of solar spots, are probably subject to the same vicissitudes as the auroras, and to the same periodicity.—Two memoirs on steam-engines, locomotives, breaks, and railway rolling stock, by M. Delacy.—Remarks on the force of the word *discovery* as applied to the Iguanodons of Bernissart, by M. P. J. van Beneden. The discovery of the large specimen recently exposed to public view in the court of the Brussels Natural History Museum, a full account of which appeared in NATURE, September 6 (p. 439), is referred to M. Fagès. But M. van Beneden shows that he was the first to determine the connection of these gigantic fossils with the Iguanodon family.—On some remains of fossil Cetacea collected in the phosphorated rocks between the Elbe and Weser, by M. P. J. van Beneden.—The following theorem is communicated by M. Catalan: a, x, y being integers, every value of x satisfying the equation $(a^2 + 1) x^2 = y^2 + 1$, is the sum of three positive squares, with the exception of $x_1 = 1$ and $x_2 = 4a^2 + 1$.—On some autographs of Grétry, the famous composer of Liége, by M. Ed. Fétis.—On some desiderata in the history of art in Belgium, by M. Ed. Mailly.

Archives of Physical and Natural Sciences, Geneva, August 15.—On some remarkable movements occasionally accompanying the fall of hailstones, by M. Daniel Colladon.—Memoir on earthquakes and volcanoes, by Prof. F. Cordenons. In this first part of a comprehensive study of underground phenomena the author gives a general classification of seismic disturbances, and examines the various hypotheses hitherto proposed to account for them.—On the nomenclature of fossils in connection with the recent discussions on botanic nomenclature, by M. Alph. de Candolle.—On the American ants (concluded), by M. H. de Saussure.—On the movements of the ground recorded at the Neuchatel Observatory, by Dr. Hirsch.—Meteorological observations with tables of temperature and barometric pressure made at the Observatory of Geneva and on the Great Saint Bernard during the month of July.

Rendiconti of the Reale Istituto Lombardo di Scienze e Lettere, July 26, 1883.—Experimental studies on the parasite of tuberculosis (Robert Koch's *bacillus*), by Prof. G. Sormani and Dr. E. Brugnatelli. The conclusions of Charnley Smith (*Brit. Med. Jour.*, January, 1883) regarding the detection of the bacilli of tubercle in the breath of consumptive patients are not confirmed. Hence consumption would not appear to be infectious.—Cure of pneumonitis effected by the cold water method of treatment, by Prof. C. Golgi.—On the quaternary vegetable fossils recently discovered by G. B. Dell' Angelo in the Re district, Val Vegezzo, by Prof. F. Sordelli.—Remarks on the various methods of distributing the current to a system of electric lamps, by Prof. R. Ferrini.—On the Institution of International Law and its operations during the years 1879–83, by C. C. Norsa.—Meteorological tables for the month of July prepared at the Royal Brera Observatory, Milan.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 21.—"Contributions to our Knowledge of the Connection between Chemical Constitution, Physiological Action, and Antagonism." By T. Lauder Brunton, M.D., F.R.S., and J. Theodore Cash, M.D.

In this paper the authors show that the physiological action of salts of ammonia varies considerably according to the acid with which the ammonia is combined. They all affect the spinal cord, motor nerves, and muscles, and tend finally to paralyse these structures. The course of poisoning varies: the chloride has at first a stimulant action on the cord while with the iodide this is less marked, and the paralysing action is more distinct. The iodide, sulphate, and phosphate paralyse motor nerves more powerfully than other salts, the iodide being the most powerful of all.

Nineteen salts of the compound ammonias were investigated. They affect the spinal cord, motor nerves, and muscles.

There is a marked difference in action between ammonia and the compound ammonias; while ammonia causes well marked tetanus, compound ammonias as a rule produce symptoms of motor paralysis, with the exception of those in which only one atom of hydrogen is substituted by an alcohol radical. This paralysis appears to be partly due to their action on the spinal cord and nerve centres, and partly to a curara-like action on the motor nerves.

Some of them apparently increase somewhat the excitability of the spinal cord at first, but this is temporary, and is shown rather by hyperæsthesia or tremor than by convulsion; and tetra-methyl and ethyl-ammonium salts differ from the di- or tri-methyl or ethyl-ammonias in having a much greater tendency to cause convulsions.

The effect of the acid radical on the physiological action is less marked in the case of the compound ammonias than in the salts of ammonia itself. The iodides of the compound ammonias paralyse motor nerves more quickly than either chlorides or sulphates.

Salts of methyl, ethyl, amyl ammonium are more active than the corresponding ones of the di- and tri-compounds, but the tetra-compounds are most active of all.

In the next part of the paper the effect of the salts of alkalies on muscle and nerve are considered. The substances investigated were the chlorides of lithium, sodium, potassium, rubidium, and cæsium. These differ from ammonia in having very little tendency to stimulate the spinal cord, and the chief symptom of poisoning by them is increasing torpor. Slight excitement of reflex action is noted at first in the case of potassium and rubidium.

The motor nerves are not paralysed by cæsium or rubidium, except in very large doses, but the other substances of this group paralyse them to a greater or less extent. Lithium and potassium are the most powerful.

The contractile power of muscle (as shown by the height of curve) is increased by rubidium, ammonium, potassium, and cæsium. It is unaffected by sodium excepting in large doses, and is almost invariably diminished by lithium.

The action of substances belonging to the alkaline earths and earths is discussed in the next section. The substances investigated were the chlorides of calcium, strontium, barium, beryllium, didymium, erbium, and lanthanum. In regard to their action upon the nervous system, these substances fall into two groups: (*a*) containing beryllium, calcium, strontium, and barium; and (*b*) containing yttrium, didymium, erbium, and lanthanum. Group *a* has a tendency to increase reflex action, as evidenced by spasm or tremor. Group *b*, reflex action in the cord appears to be little affected, but they appear to have a tendency to paralyse motor centres of the brain in the frog. Group *a* all paralyse motor nerves to some extent. Lanthanum has also a slight paralysing action, but the other members of group *b* have not, agreeing in this respect with sodium and rubidium, and differing from all the others. The *contracture* produced by barium is enormous, resembling that produced by veratria, as the authors have shown in a former paper. It is like that of veratria diminished by heat, cold and potash, and may be abolished by these agents. It is not so well marked when the drug is injected into the circulation, as when locally applied to the muscle.

The action of some of the more important of those drugs can be graphically represented by a spiral, the terminal members of which are potassium and barium, and these two are to a certain extent connected by ammonium as an intermediate link.

The alterations effected in the action of the different members of these groups on muscle by the subsequent application of another is next discussed, and it is shown that the effect of one substance upon muscle may be increased or diminished by the application of another. One of the most curious points is that two substances having a similar action may, instead of increasing, neutralise each other's effect.

Barium, calcium, strontium, yttrium, and beryllium cause a great prolongation of the muscular curve or *contracture*. Some relations are pointed out between the atomic weights of antagonising elements of which the data are too limited to draw from them any general rule, but the authors think that they may possibly lead by and by to some useful result. Thus rubidium in large doses has the same effect as barium in causing a veratria-like curve, but barium destroys the effect of rubidium before producing its own effect.

Rb $85{\cdot}4 \times 8 = 683{\cdot}2$
Ba $137 \times 5 = 685$.

In the next division the authors show that by alternate application of acids and alkalies the muscle of the frog may be made to describe, on a slowly revolving cylinder, curves which almost exactly resemble those described on a quick cylinder by the normal contraction of a muscle on stimulation; and also those which the muscle describes on irritation after it has been poisoned by barium. They consider that the contraction of muscle may be possibly due in some measure at least to alterations in acid or neutral salts which the muscle contains.

Entomological Society, September 5.—Mr. J. W. Dunning, F.L.S., president, in the chair.—Baron Osten-Sacken of Heidelberg was elected a member of the Society.—Sir S. S. Saunders exhibited *Idarnella caricæ*, Hasselq., which had been lost sight of for more than a century; and other interesting fig-insects.—Mr. F. Enock exhibited an hermaphrodite specimen of *Macropis labiata*, Panz.—Mr. J. Coverdale exhibited specimens of *Grapholitha cæcana*, Schläger, a *Tortrix* new to Britain.—The Rev. H. S. Gorham read a revision of the genera and species of Malacoderm *Coleoptera* of the Japanese fauna, part i., *Lycidæ* and *Lampyridæ*.

SYDNEY

Linnean Society of New South Wales, July 25.—Prof. W. J. Stephens, M.A., in the chair.—The following papers were read:—On the myology of the Frilled Lizard (*Chlamydosaurus Kingii*), by Charles De Vis, B.A. The author does not find there is any special muscular mechanism connected with the reptile's habit of elevating the frill and of occasionally assuming the erect attitude. The function of the frill he regards as being partly to frighten assailants, partly to aid in the collection and concentration of the waves of sound.—Descriptions of Australian Microlepidoptera, No. 9, by E. Meyrick, B.A.—Some remarks on the action of tannin on Infusoria, by Harry Gilliatt.

PARIS

Academy of Sciences, September 10.—M. Blanchard, president, in the chair.—On certain predictions relative to seismic disturbances, by M. Faye. The author exposes the groundless character of the theory recently advanced by M. Delauney and others, regarding the connection of earthquakes with the planetary movements, and more particularly with the supposed transit of Jupiter through the August meteors.—Separation of gallium (continued). Separation from titanic acid, by M. Lecoq de Boisbaudran.—A new method of filtration for highly diluted precipitates, by M. Lecoq de Boisbaudran.—Memoir on induction, by M. P. Le Cordier. In this paper the author adopts the theory of a continuous and incompressible medium, by the translations and pressures of which are produced electric currents and electrostatic phenomena. Electromotor and electrostatic effects of induction are calculated approximately for a hollow sphere forming an insulated conductor, homogeneous, isotropic, and non-magnetic, turning with a constant angular velocity round a fixed axis in a uniform and permanent magnetic field.—Experiments made at Grenoble, by M. Marcel Deprez, on the transmission of force by electricity. Note communicated by M. Boulanger on behalf of the Committee appointed by the city of Grenoble to follow these experiments.—Cholera from the standpoint of chemistry, by M. Ramon de Luna. From his chemical and physiological studies in Madrid and the Philippines the author concludes that cholera is propagated exclusively through the respiratory organs, and that the only safe treatment is the inhaling of hypoazotic vapour mixed with air. The best prophylactic is also found in hypoazotic fumigations of rooms, utensils, &c., twice a day. During the terrible outbreak at Manilla, in 1882, this treatment was adopted with complete success in the case of three hundred artisans employed in the mint.—Observations of the new comet discovered by Mr. Brooks on September 2, and of the planet 234 made at the Paris Observatory (equatorial of the West Tower), by M. G. Bigourdan.—Proposition on a question of mechanics touching the figure of the earth, by M. E. Brassinne.—Laws of induction due to the variation of intensity in currents of diverse forms; circular current, by M. Quet.—On the absorption of the ultra-violet rays by albuminoid substances, by M. J. L. Soret. From his experiments, in which he was assisted by MM. Danilewsky and Denis Monnier, the author concludes that all albuminoid substances hitherto studied contain a common principle, to which is due their characteristic absorptive band. Gelatine, which in so many other respects differs from albumen, acts quite differently. It is much more transparent, and gives rise to no bands.—On the proportion of food consumed by dogs under various temperatures, by M. Guimaraes. In the normal state the average daily consumption varied from one-tenth to one-sixteenth of the weight of the body; in a temperature of 10° to 12° C. from one-ninth to one-twelfth.—On the division of the cellular nucleus in plants, by M. L. Guignard.—On the structure of the leaf of the fossil genus *Sphenophyllum*, ranging from the Lower Carboniferous to the Upper Permian systems, by M. B. Renault.—General conclusions on the causes of chemical change in wheaten flour, and on the best conditions for preserving it for long periods in a sound state, by M. Balland.

September 17.—M. Blanchard, president, in the chair.—Allusion was made by the president to the loss sustained by the Academy in the person of M. Puiseux, member of the Geometrical Section, who died at Frontenay on September 9.—On the destructive fires caused by lightning, with some suggested improvements in lightning conductors (one illustration), by M. D. Colladon.—On the possibility of increasing the irrigating waters derived from the Rhone by regulating the discharge from the Lake of Geneva, by M. Ar. Dumont. The author dwells on the great benefits likely to be conferred on the southern departments of France by the project recommended by the Geneva Commission. This project, which might be carried out at an expenditure of about 180,000*l.*, involves the creation of a hydraulic force of 7000 horse-power, by which the level of the lake at high water might be reduced by at least 0·60 m., and the minimum discharge of the Rhone at the outlet increased by 80 mc. per second.—Elements and ephemerides of the Pons-Brooks comet of 1812, by MM. Schulhof and Bossert.—Search for the red star observed during the total eclipse of the sun on May 6, 1883, by M. E. L. Trouvelot. The subsequent disappearance of this object might perhaps justify the supposition that it was an intra-Mercurial planet. But pending more accurate observations the author suspends his judgment on this point.—On the double star Σ 2400 of the Dorpat Catalogue, by M. Perrotin.—Electric law of the conservation of energy under all forms at entrance and issue of any material system traversed by the electric current, by M. G. Cabanellas.—On a new capillary electrometer, by M. A. Chervet.—Note on Hall's electric phenomenon, by M. Aug. Righi.—Qualitative research of manganese in the zinc of commerce, in zinc ashes and zinc spar, and search for bismuth in the lead of commerce by means of electrolysis, by M. A. Guyard.—New observations on the microbes of fishes, by MM. L. Olivier and Ch. Richet.—On the olfactory apparatus in the antennæ of Vanessa Io, by M. J. Chatin.—On the venomous properties of the jequirity, by MM. Cornil and Berlioz.—On the microbes found in the liver and kidneys of victims to yellow fever (three illustrations), by M. Babes.

CONTENTS