

and not the geographical equator, is really the dividing line between the currents of the northern and southern hemispheres.

PARIS.

Academy of Sciences, June 26.—M. Loewy in the chair.—On the employment of Lagrange's equations in the theory of impact and percussions, by M. Paul Appell.—Theoretical calculation of the inferior contraction in weirs with thin walls and sheets free below, when this contraction attains its greatest values; with experimental verifications, by M. J. Boussinesq.—Formation of natural phosphates of aluminium and iron; phenomena of fossilisation, by M. Armand Gautier. Aluminium phosphate was formed in the Minerva grotto by the action of ammonium phosphate, resulting from the destruction of a bank of guano, upon a subjacent layer of hydrargilite. This action is easily reproduced experimentally. It is even possible to form a small quantity of aluminium phosphate by the prolonged action of ammonium phosphate upon kaolin. Iron phosphates are produced by the action of ammonium phosphate upon spathic iron ore. This is probably the usual origin of vivianite. It is shown that the simultaneous formation of ammonia, sulphuretted hydrogen, and other products of slow bacterial fermentation, with the action of the air dissolved in water, gives rise, in strata at the same time calcareous and ferruginous, to the simultaneous production of lime phosphates and of pyrites.—Note by M. Daubrée accompanying the presentation, in the name of its authors, of the geological map of European Russia.—Observations of the planet Charlois (1893 Z) made with the 14-inch equatorial of the Bordeaux Observatory by M. L. Picart.—On the maximum modulus which a determinant can attain, by M. Hadamard.—Experimental determination of the constant of universal attraction, and of the mass and density of the earth, by M. Alphonse Berget.—On the third principle of energetics, by M. H. Le Chatelier. The laws of the conservation of mass, of momentum, of quantity of electricity, of the centre of gravity, &c., can be embodied in a single law as follows: The individual "energy capacities" of an isolated system are constant, except that of heat (entropy) which increases in irreversible transformations. This "energy capacity," so termed by Ostwald, is made up of several factors of the type of those enumerated above.—On the employment of mercury in potential equalisers by flow, by M. G. Gouré de Villefontaine.—Research on the dielectric constants of some biaxial crystals, by M. Ch. Borel. The principal constants of five rhombic and ten clinorhombic substances were determined by finding their axes of polarisation and measuring their periods of oscillation in a uniform electric field, and also measuring the attraction along each axis of polarisation. The crystals were cut in the shape of spheres. The attraction method was like that used by Boltzmann, except that his bifilar balance was replaced by a unifilar quartz fibre balance. Most of the substances examined were double sulphates. A redetermination of the constants for rhombic sulphur showed a closer agreement with Maxwell's law than Boltzmann's results.—On a new method of directly transforming alternating into direct currents, by M. Charles Pollak.—On the combinations of oxalic acid with titanate and stannic acids, by M. E. Pechard.—Researches on the chlorosulphides of arsenic and antimony, by M. L. Ouvrard.—Action of carbonic oxide upon sodammonium and potassammonium, by M. A. Joannis.—On the combinations of boron bromide with the bromides of phosphorus, by M. Tarible.—On the action of zinc and magnesium on metallic solutions and on the estimation of potash, by MM. A. Villiers and Fr. Borg.—Observations on a marine miocene raudannite of the Limagne d'Auvergne, by M. Paul Gautier.—The duration of excitability of the nerves and muscles after death is much greater than is generally believed, by M. A. d'Arsonval. This may be shown by means of the myophone, a kind of microphone arranged so as to indicate small muscular contractions. The instrument gives indications of muscular excitability in a rabbit even ten hours after death.—Remarks on M. d'Arsonval's paper, by M. Brown-Séguard. The fact that a muscle under the influence of complete cadaveric rigidity, remaining perfectly inert under the influence of the strongest impulses provoking contraction, is capable of rhythmic motor actions when its nerve is excited, is one of the most interesting discoveries in the physiology of nerves and muscles.—Sketch of the principal anatomo-pathological types of adult chronic gastritis, by M. Georges Hayem.—Observations on ice, made during the cruise of *La Manche*, by M. G. Pouchet.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Elements of Psychology: Prof. J. M. Baldwin (Macmillan).—Everybody's Guide to Music: J. Booth (Saxon).—A Handbook on the Steam-Engine: H. Haeder, translated by H. H. P. Powles (C. Lockwood).—Murray's Handbook—Switzerland, Savoy, Piedmont, 18th edition (Murray).—University Correspondence College Calendar, 1892-93 (London).—Worked Examples in Co-ordinate Geometry (Clive).—A Biographical Index of British and Irish Botanists: J. Britten and G. S. Boulger (West, Newman).—Foundations of the Atomic Theory (Alembic Club Reprints, No. 2): Dalton, Wollaston, and Thomson (Edinburgh, Clay).—Im Reiche des Lichtes, Sonnen, Zodiakallichte, Kometen: H. Gruson (Asher).—Hourly Meteorological Observations made at the Madras Observatory, January, 1856, to February, 1861 (Madras).

PAMPHLETS.—Sir J. B. Lawes and the Rothamsted Experiments: C. M. Aikman (Glasgow).—U.S. Department of Agriculture: Reports of Observations and Experiments in the Practical Work of the Division (Washington).—Traces of Glacial Man in Ohio: W. H. Holmes (Chicago).—Are there Traces of Man in the Trenton Gravels: W. H. Holmes (Chicago).—Distribution of Stone Implements in the Tide-Water Country: W. H. Holmes (Chicago).—Report and Proceedings of the Ealing Microscopical and Natural History Society for 1892 (Ealing).—Yorkshire Carboniferous Flora: R. Kidston (Leeds).

SERIALS.—Proceedings of the Royal Society of Victoria, Vol. v. new series (Williams and Norgate).—Journal of the Royal Microscopical Society, June (Williams and Norgate).—Journal of the Asiatic Society of Bengal, Vol. lxi. Part 2, No. 3, 1892 (Calcutta).—Journal of the Royal Agricultural Society of England, third series, Vol. 4, Part 2, No. 14 (Murray).—The Botanical Gazette, June (Bloomington, Ind.).—Nyt Magazin for Naturvidenskaberne, 33te Bind, 4de og, 5te Hefte (Christiania).—L'Astronomie, July (Paris).—Himmel und Erde, July (Berlin).—Journal of Botany, July (West, Newman).

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