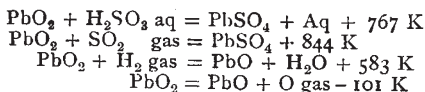


SCIENTIFIC SERIALS.

American Journal of Science, December. — Inversion of temperatures in the 26.68 day solar magnetic period, by Frank H. Bigelow. The northern low-pressure and the southern high-pressure belts of North America vary in latitude directly with the solar magnetic intensity, being further north at the maximum and further south at the minimum of the period; whilst the northern high and southern low-pressure belts vary in the opposite manner. This means that an increase of solar magnetic intensity generates the cyclones further south, and causes the anti-cyclones from the polar circulation to travel to the south.—Remarks on colloidal silver, by C. Barus. Colloidal silver possesses properties which can be explained with reference to the analogous behaviour of suspended sediments, allowance being made for differences in the size of particles. The high degree of insulation detected in Carey Lea's metallic mirrors may be interpreted as an instance of the altered behaviour of non-coherent metallic matter.—Resonance analysis of alternating currents, by M. I. Pupin. Part ii. Closed magnetic circuit transformers distort the primary current considerably more than transformers with open magnetic circuits under equal degrees of magnetisation. A ferric self-inductance in circuit with an alternator which gives a simple harmonic E.M.F. distorts the current by introducing higher odd harmonics, principally the harmonic of three times the frequency of the fundamental. Rotary magnetic fields produced by reasonably well-constructed machines are not accompanied by fluctuations in their intensity.—An improved form of interruptor for large induction coils, by F. L. O. Wadsworth. The interruptor consists of a brass wheel about six inches in diameter, with two insulating and two contact segments placed in its circumference, and mounted directly on the shaft of a small electric motor making about 1200 revolutions per minute. Two copper brushes are made to bear on the hub of the wheel and its circumference respectively. The hub and the conducting sectors are in one piece. The insulators are made of slate.

Wiedemann's Annalen der Physik und Chemie, No. 12.—On the measurement of surface tension of water in capillary tubes of different glasses, by P. Volkmann. A good wetting capacity may be insured by soaking the glass tubes in caustic potash, and then washing with distilled water. That the tubes are perfectly wetted is shown by the perfect mobility of the line of contact. The more nearly circular the section of a tube is, the more does the value of the surface tension of water approach 7.38 mg/mm. at 20.2° C., whatever the kind of glass. Tubes of very small diameter give larger values.—On the thermochemical processes in the secondary cell, by Franz Streintz. The following thermochemical equations were derived from the author's experiments:



The E.M.F. resulting from these equations is 1.885 volts. One of the cells worked with, that having the least concentration, gave 1.90 volts.—On the magnetisation of iron and nickel wires by rapid electric oscillations, by Ignaz Klemencic. The strong damping action of magnetisable metals upon electric oscillation is explained by their circular or transverse magnetisation, which crowds the oscillations into the surface layers much more than in the case of other metals. Hence the resistance of a magnetisable wire to electric oscillations is much greater than that of another of equal conductivity. This resistance was determined by studying the development of heat in the wire by means of a thermo couple. The permeabilities of the metals deduced by the formulæ of Lord Rayleigh and Stefan were: Soft iron, 118; steel pianoforte wire, soft 106, hard 115; Bessemer steel, soft 77, hard 74; nickel, 27. These are very near the values found by Baur and Lord Rayleigh for feeble magnetising fields.—Studies of the electric resonator, by P. Drude. The author shows that a Hertzian resonator must be chiefly affected by the electric forces playing at that part of the resonator circuit which lies opposite the gap, and proves this experimentally. The resistance of a Zehnder vacuum tube used in these experiments was incidentally found to be 2870 million ohms when the interruptor made 25 breaks per second.

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SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, December 5.—Capt. H. J. Elwes, President, in the chair.—Mr. F. Merrifield exhibited hybrids belonging to the genus *Saturnia*, obtained by Dr. Standfuss, of Zürich; viz. a male and female hybrid from a male of *Saturnia pavonia* and a female of *Saturnia pyri*, to which he had given the name of *Saturnia emilia*; also hybrids from what Dr. Standfuss described as “a male of *Callimorpha dominula*, var. *persona*” (received from Tuscany) and a typical female of *Callimorpha dominula*, to which he had given the name of *romanovi*. Mr. Merrifield remarked that the so-called var. *persona* differed entirely from the type of *Callimorpha dominula*.—Mr. J. W. Tutt exhibited, and read notes on, specimens of a very small form of *Euchloë*, taken in Shropshire by the Rev. F. B. Newnham, who was of opinion that it was distinct from *E. cardamines*. He pointed out that it was much smaller than the latter species, and that the discoidal spot was placed as in *E. turritis* and *E. gruneri* at the juncture of the orange and white spaces, and not, as in *E. cardamines*, well within the orange tip. Mr. Tutt also exhibited, and read notes on, specimens of *Noctua dahlia*, from Cheshire, Essex, Yorkshire, Aberdeenshire, and other counties. The variation in the specimens was said to be partly due to their geographical distribution. Herr Jacoby read a letter received from Mr. Buxton Forman, one of the Assistant Secretaries of the Post Office, to the effect that the Postal Union had decided to make a rule not to allow natural history specimens to be sent by sample post, which was intended for the transmission of *bonâ fide* trade patterns or samples of merchandise, and consequently that the forwarding of such specimens at the sample rate would in future be irregular. Lord Walsingham, F.R.S., stated that he had had a long correspondence with the Post Office authorities on the subject, and that the late Mr. Raikes, when Postmaster-General, promised him in 1891 that such specimens should, so far as the British Post Office was concerned, be transmitted at the sample rates; and a letter to the same effect, from the late Sir Arthur Blackwood, when Secretary of the Post Office, was published in the *Proceedings* of the Society for 1891.—Mr. C. G. Barrett exhibited, for Mr. A. J. Hodges, a specimen of *Hydrilla palustris*, from Wicken Fen, also specimens of *Caradrina ambigua*, from the Isle of Wight. He remarked that one specimen of the latter had the hind margin of the right fore-wing indented, and the wing broadened as though from an injury to the pupa. In this wing the margins of the large orbicular and reniform stigmata had become so joined that the dividing lines had disappeared, and the stigmata were fused into one irregular blotch.—Mr. McLachlan, F.R.S., exhibited, on behalf of Mr. G. F. Wilson, F.R.S., a “grease band” which had been tied round trees to prevent the females of *Cheimatobia brumata* from ascending the trunks for the purposes of oviposition; the band was thickly covered with the bodies of the females, together with a few males.—Surgeon-Captain Manders exhibited a pair of *Chelura bifasciata*, from the Shan States, and called attention to the “assembling” habits of the males, some hundreds of which were attracted by the numerous females which emerged from the cocoons at sunset.—Mr. B. A. Bower exhibited a beautiful variety of *Zygana lonicera*, Esp., having the spots confluent, taken at Chattenden Wood, North Kent, in June last.—Mr. H. Goss exhibited, for Mr. F. W. Ulrich, of Trinidad, a series of males, females, and workers of *Sericomyrmex opacus*, Mayr., a species of fungus-growing and fungus-eating ant.—Colonel Swinhoe read a paper entitled “A List of the *Lepidoptera* of the Khasia Hills, Part III.”—Mr. C. J. Gahan read a paper entitled “On the Longicorn *Coleoptera* of the West India Islands.”—Mr. F. W. Ulrich communicated a paper entitled “Notes on the Fungus Growing and Eating Habit of *Sericomyrmex opacus*, Mayr.”—Prof. E. B. Poulton, F.R.S., read a paper, by Prof. E. B. Titchener, entitled “An apparent case of Sexual Preference in a male Insect.”—The Rev. H. S. Gorham communicated a paper entitled “Notes on Herr A. Kuwert's Revision der Cleriden-gattung *Omadius*, Lap.”

Geological Society, December 5.—Dr. Henry Woodward, F.R.S., President, in the chair.—Supplementary note on the Narborough district (Leicestershire), by Prof. T. G. Bonney, F.R.S.—The tarns of Lakeland, by J. E. Marr, F.R.S. The author had examined several tarns of the English Lake district.

In those cases where the stream issues from the tarn over solid rock, he found either (1) direct evidence that the tarn results from the blocking up of part of a pre-existing valley by drift, causing the deflection of the water to a direction different from that of the original stream in this locality; or (2) evidence which is perfectly consistent with such an explanation of the origin of the tarn. Under the circumstances he submitted that tarns cannot be assumed to lie in rock-basins simply because the issuing stream flows over solid rock (and this assumption has been made), but that those who maintain the existence of such rock-basins must prove the occurrence of solid rock entirely around the tarn.—Description of a new instrument for surveying by the aid of photography, with some observations upon the applicability of the instrument to geological purposes, by J. Bridges Lee. The instrument described in this paper consists essentially of a photographic camera fitted inside with a magnetic needle, which carries a vertical transparent scale divided and numbered to 360°, and also with cross fibres which intersect at right angles. The fittings and adjustments of the instrument are of such a character that the camera can be accurately levelled and directed towards any point in a horizontal direction, and when a photograph is taken in an ordinary way the bearing of the median vertical plane which bisects the instrument through the photographic lens will be recorded automatically on the face of the photograph. The vertical fibre (and its image on the photograph) serves as an index to read the bearing; and the same fibre marks by its shadow a line right across the photograph, which marks the median vertical plane on the image. The horizontal fibre is adjusted to mark on the image the horizontal plane which bisects the photographic lens.—The marble beds of Natal, by David Draper.

Royal Microscopical Society, November 21.—Mr. A. D. Michael, President, in the chair.—Messrs. Swift exhibited and described a microtome, which was made as an improvement on the Cambridge rocking microtome. The chief features were that the razor could be fitted at any angle that might be found best suited to the substance it was desired to cut, that it was possible to cut sections embedded in celloidin in spirit, and that it could be used with the ether-freezing apparatus. Messrs. Swift also exhibited an improved example of their new mechanical stage. The milled heads of the stage were now placed on the same side; the stage had also a greater lateral movement than in the first examples.—Dr. Measures exhibited a new mechanical stage by Messrs. Zeiss. He considered that it would be found to be better protected than the old one, and it would admit a much larger plate. It was also fitted with verniers in both directions reading to $\frac{1}{10}$ of a millimetre.—Dr. W. A. Turner gave a lantern demonstration on recent methods of staining sections of the central nervous system.—Mr. E. M. Nelson described a simple method for measuring the refractive indices of media. He also described a new reflecting camera lucida, and a portable microscope by Zentmayer.

Zoological Society, December 4.—Henry Seebohm, Vice-President, in the chair.—A communication was read from Mr. T. Manners Smith, on some points in the anatomy of the water-mole (*Ornithorhynchus paradoxus*). The paper related chiefly to the muscular anatomy of *Ornithorhynchus*, which was followed by a short description of the trunk-arterial system. As regards the anatomy, Mr. Smith appeared to have worked out for the first time the comparative morphology of the skeletal muscles of the Monotremes as determined by their innervation.—Mr. F. E. Beddard, F.R.S., read a paper upon certain points in the visceral anatomy of *Ornithorhynchus*. The paper dwelt in the first instance with the existence of a free fold passing from the bladder to the liver, where it became continuous with the falciform ligament of the liver. This fold, however, exhibited no traces of an anterior abdominal vein. The author also gave a description of the right auriculo-ventricular valve of the heart. In two hearts examined by him the septal flap of this valve was complete, though less conspicuous than the free flap, owing to the fact that it had either no papillary muscles attached to it, or that the muscles were very small.—Mr. Boulenger read a second report on additions to the Lizard Collection in the Natural History Museum.—Prof. F. Jeffrey Bell called attention to the acquisition by the Natural History Museum of some specimens of remarkable corals of great size from North-west Australia, of which he showed some admirable photographs taken by Mr. Percy Highley. Prof. Bell urged the necessity of the acquisition of large specimens of corals, before coming to any conclusion as to their specific distinctions.

PARIS.

Academy of Sciences, December 10.—M. Lœwy in the chair.—The Secretary announced the death of M. Tchêbichef, foreign associate, on December 8.—The decease of M. Ferdinand de Lesseps, on December 7, was referred to by the President, and the meeting adjourned, after receiving the correspondence, as a mark of respect for the deceased member.—A study of the different varieties of graphite, by M. Henri Moissan. Any variety of carbon may be converted into graphite by sufficiently raising the temperature. This graphite may be amorphous or crystalline. Its specific gravity varies from 2.10 to 2.25. Its ignition point in oxygen is about 660°. Its stability, as evidenced by its resistance to transformation into graphitic acid, depends on the temperature to which it has been raised.—A survey made by means of photography, for the delimitation of the frontier between Alaska and British Columbia, by M. Laussedat.—On the secular variations of the orbits of the four interior planets, by Prof. S. Newcomb. (See "Our Astronomical Column.")—On a new ossiferous cavern discovered at Pointe-Pescade, to the west of Alger-Saint-Eugène, by M. A. Pomel. There appears to be no trace of man or of the monkey, though numerous other species of animals are represented in the remains.—On the solution of numerical equations by means of recurrent series, by M. R. Perrin.—On the composition of linear forms and congruences, by M. Stouff.—On elimination, by M. Hadamard.—On the law of resistance of air, by M. C. Chapel. A claim to priority over M. Vallier in regard to the empirical laws recently enunciated by the latter.—An experimental theory of the clipping and punching of metals, by M. Ch. Fremont. A machine is described with which the author has succeeded in registering the work done during punching operations on an indicator diagram.—Integration of the equations of light in transparent and isotropic media, by M. E. Carvallo.—Electromotive force of magnetisation, by M. D. Hurmuzescu.—Determination of the proportions of carbonate of lime and carbonate of magnesia in earths, ashes, &c., by M. Albert Trubert. A description of a simple indirect analysis.—The phosphate of the Grande Connétable, by M. A. Andouard.—On pectase and pectic fermentation, by MM. G. Bertrand and A. Mallèvre. The conclusions have been arrived at, that (1) this ferment is not able to coagulate pectin when acting alone; (2) it produces this transformation only in presence of salts of calcium, barium, or strontium; (3) the precipitate produced is an alkaline-earthly pectate.—On a new process for the purification of alcohols, sugars, and a certain number of other organic matters, by M. E. Maumené.—Influence of radiation at low temperatures on the phenomena of digestion; Frigotherapeutics, by M. Raoul Pictet.—On the morphology and classification of the Coccidians, by M. Alphonse Labbé.—Succession of the lower Tertiary strata in the cretaceous protuberance of Saint-Sever, by M. L. Reyt.—On the *calcaires à lithothamnium* of the valley of the Chellif, by M. Repelin.—Influence of the dryness of the year 1893 on the forest vegetation in Lorraine, by M. Henry. The production of wood for 1893 was but 30 to 76 per cent. of the normal yield.—The ascension of the balloon *Archimède* (October 11, 1894). Comparative thermometric and hygrometric diagrams of the aerostat gas and the surrounding atmosphere, by MM. Gustave Hermite and Georges Besançon.

BERLIN.

Physical Society, November 16.—Prof. von Bezold, President, in the chair.—Prof. H. W. Vogel spoke on the perception of colours, and demonstrated the various effects which monochromatic illumination has on a series of pigments. The effect of two coloured lights on the several pigments was specially interesting. Thus, for instance, red or yellow squares illuminated by yellow and red light appeared to be white and grey; under yellow and blue they appeared to be red, and in yellow and green lights they appeared the same as when illuminated by white light. Dr. Rubens gave an account of experiments carried out on a large scale in conjunction with W. and E. Rathenau on telegraphing to a distance without wires. They were based, in contradistinction to those of Preece, on the principle of the distribution of currents in the conducting earth. On the banks of the Wannsee, near Potsdam, two electrodes were sunk in the water at a distance from each other of 500 metres, and a current from fifty-five accumulators placed on the bank was sent through them. From each of two boats connected by a cable an

electrode was immersed in the water, and a telephone inserted into the connection. When the current from the accumulators on the bank was broken, this produced an effect on the telephone audible at a distance of 4.5 kilometres. Small islands lying between the shore and the boats had no influence on the transmission of the signals.

Meteorological Society, November 6.—Prof. Hellmann, President, in the chair.—Dr. Meinardus spoke on sheet-lightning and the various theories in explanation of this phenomenon. He sided with the view that it is due to a thunderstorm of which the lightning is visible, whereas the thunder does not reach the observer owing to total reflection brought about by refraction in the several superimposed layers of air.—Prof. von Danckelman spoke on the climate of Jalu, on the basis of observations made by Dr. Steinbach since the beginning of 1893 with accurate self-registering instruments. Among the peculiarities of the climate, which is continuously and uniformly warm and moist, it is more especially remarkable that thunderstorms and heavy rainstorms occur most usually between 9 and 10 o'clock in the morning. This phenomenon has not as yet been observed anywhere else.

Physiological Society, November 9.—Prof. du Bois Reymond, President, in the chair.—Dr. Levy-Dorn spoke on the effect of various temperatures on the secretion of sweat, and communicated the results of his own experiments on cats, dealing with the secretion of sweat at low temperatures. The sweat glands themselves were kept at the temperature (19°–30° C.) most favourable for the secretion, while the animal's body was cooled by water at 6° C., and secretion was obtained as a result of dyspnoea, notwithstanding the cooling of the body. The same speaker further gave an account of experiments made with a view to testing Prof. Grützner's assertion that heat acts only on centripetal and vasomotor nerves, but does not affect motor or centrifugal nerves. Carefully observing all the experimental conditions described by Grützner, he had found that the action of heat on the sciatic nerve leads to a copious secretion of sweat on the cat's paws, that is to say, stimulates centrifugal nerves.—Prof. Zuntz criticised the objections raised by Bohr and Henriquez against his experiments on the measurement of the work done by the heart, and showed up the errors which had crept into their observations. He next demonstrated the apparatus he had employed for measuring the amount of blood forced out by the heart.

NEW SOUTH WALES.

Linnean Society, October 31.—Prof. Haswell, Vice-President, in the chair.—Notes of a visit to the island of Erromanga, New Hebrides, in May 1894, by Sutherland Sinclair.—Preliminary communications on the cerebral commissures of the mammalia, with special reference to Monotremata and Marsupialia, by G. Elliott Smith. From an examination of the brain in *platypus*, *Echidna*, *Perameles*, kangaroo, wallaby, kangaroo rat, *Dasyurus* and phalangista, the superior commissure of the cerebrum was shown by the author to be homologous with the psalterium of Placentalia, and not with the corpus callosum. There appears to be no true corpus callosum (as distinct from a psalterium) in any monotreme or marsupial. The hook-like appearance of the hippocampal commissure in sagittal section in marsupials, which led Flower to regard it as corpus callosum, was said to correspond to the shape of the hippocampus, which is co-extensive with the lateral ventricle. In platypus only the dorsal limb of the hook is present, because there is only a rudimentary descending horn of the ventricle and hippocampus. In Eutheria only the ventral limb persists, because the upper and anterior part of the hippocampus disappears to allow a corpus callosum to appear in the situation occupied by the dorsal limb of the hippocampal commissure in Metatheria, *i.e.* ventral to the arcus marginalis. The fascia dentata, as a consequence of this, is essentially *supracallosal*. A doubt was expressed as to the presence of any structure in the submammalia strictly homologous to the Eutherian corpus callosum. The hypothesis was advanced that the latter structure appears (just as the hippocampal commissure does somewhat earlier) to supply the demand for a shorter connecting path for the great pallial development—essentially a mammalian feature.—Descriptions of some new species of Australian Coleoptera, by A. M. Lea. Descriptions were given of forty-nine species from New South Wales, mostly belonging to the *Anthicidae*. A remarkable *Protopalus* from the Tweed River was described, and

a species of *Lagriia* living in ants' nests.—Description of a new *Isopogon* from New South Wales, by R. T. Baker. The *Isopogon* described was obtained on the Murrumbidgee Ranges, Goulburn River. It differs from the N.S.W. *I. anemonifolius* in having deeply-divided leaves on long petioles and a silky hairy perianth; from the West Australian *I. longifolius* in its longer and pinnately divided leaves, smaller cones and longer perianth.—Synonymy of some Australian and Tasmanian mollusca, by John Brazier. The synonymy of twelve species were given with references and habitats.—Further observations upon the anatomy of the integumentary structures in the muzzle of *Ornithorhynchus*, by Prof. J. T. Wilson and C. J. Martin. The authors specially dealt with the details of structure of the "push-rods" in the skin of the snout of the platypus, and offered further confirmation of their views in opposition to a recent criticism of some of these by Prof. E. B. Poulton.—Description of the external characters of a very young specimen of *Ornithorhynchus*, by Prof. J. T. Wilson.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Books.—University Tutorial Series, Vol. 1: A Text-book of Sound: E. Catchpool (Clive).—Manual of Practical Morbid Anatomy: Drs. Rolleston and Kanthack (Cambridge University Press).—The Book of the Rose: Rev. A. Foster-Melliar (Macmillan).—An Elementary Treatise on Theoretical Mechanics, Part 3: Kinetics: Prof. A. Ziwet (Macmillan).—Natural Rights: Prof. D. G. Ritchie (Sonnenschein).—Elementary Qualitative Chemical Analysis: Dr. F. Clowes and J. B. Coleman (Churchill).—Pubblicazioni della Specola Vaticana, Vol. IV. (Torino, Artigianelli).—A Few Chapters in Astronomy: C. Kennedy (Taylor and Francis).
 PAMPHLETS.—On the Natural Immunity against Cholera, &c.: C. G. Gumpel (Williams and Norgate).—Elliptical Orbits: H. Larkin (Unwin).—Royal Gardens, Kew. Hand-list of Trees and Shrubs grown in Arboretum, Part 1: Polypetalæ (Eyre and Spottiswoode).
 SERIALS.—Engineering Magazine, December (Tucker).—American Journal of Science, December (New Haven).—Strand Magazine, December (Newnes).—Natural History Transactions of Northumberland, &c., Vol. XI. Part 2 (Williams and Norgate).—Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande, &c., Einundfünfzigster Jahrgang, Sechste Folge. L. Jahrgang. Erste Hälfte (Bonn, Cohen).—Medical Magazine, December (Strand).—Le Monde Moderne, January (Paris).—American Naturalist, December (Wesley).—Strand Musical Magazine, No. 1 (Newnes).—Royal Natural History, Part 14 (Warne).

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