

out and frame a rational system even though some parts of it for a time rest upon hypothetical grounds.

A REVISED ARRANGEMENT OF THE BENTHAMIAN "SERIES" OF FLOWERING PLANTS.

Monocotyledons.

- Apocarpæ.
- Coronariæ.
- Nudifloræ.
- Calyciæ.
- Glumacæ.
- Hydrales. (Hydrocharidææ).
- Epigynæ.
- Microspermæ.

Dicotyledons.

Polypetalæ.

- Thalamifloræ (including the apetalous Curvembryææ, Micrembryææ, and "Ordines Anomali," and the Euphorbiacææ and Urticacææ, &c., of the Unisexuales).
- Discifloræ (including the apetalous Daphnales and the Juglandacææ and Cupuliferææ, &c., of the Unisexuales).
- Calycifloræ (including the apetalous Aristolochiacææ and Cytinacææ).

Gamopetalæ.

- Heteromeræ.
- Bicarpellatæ.
- Inferæ.

SCIENTIFIC SERIALS.

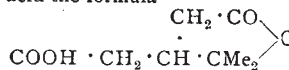
American Journal of Science, September. — Fireball of January 13, by H. A. Newton (see p. 524).—On a photometric method which is independent of colour, by Ogden N. Rood. This is not based, like most previous methods, upon the comparison of the luminosities of two adjacent surfaces, but upon the shock that is produced upon the retina by a change of intensity of light. If one-half of a rotating disc reflects less light than the other by 1-50th of the whole amount, with appropriate rates of rotation a faint flickering will be noticed. This flickering disappears if the two halves have the same degree of brightness, whatever may be their colours.—On the oscillations of lightning discharges and of the Aurora Borealis, by John Trowbridge. Photographs were obtained of sparks having both great electromotive force and great quantity, produced by an alternating machine giving from 300 to 400 alternations per second, with the aid of a step-up transformer and an oil condenser. The oscillations were investigated by Feddersen's rotating mirror method. The sparks were about 2 cm. long, and the interval between two successive oscillations was one hundred-thousandth of a second. On each of the photographs reproduced some ten or twelve oscillations can be counted. The discharge is seen to follow exactly the same path three times in succession. After that it assumes the character of a brush discharge. By intercalating a non-inductive water resistance and a vacuum tube between the terminals of a suitable transformer it is possible to imitate exactly the phenomena observed when a vacuum tube is held in one hand while the other hand grasps the terminal of the transformer. In observing the striæ and waving columnar form of the light excited in this manner in tubes filled with rarefied gases, one is led to believe that the stratified form of the Aurora Borealis is produced in a similar manner.—On the estimation of chlorates and nitrates, and of nitrites and nitrates in one operation, by Charlotte F. Roberts. By means of the apparatus for the estimation of nitrates previously described, chlorates and nitrates together may be estimated. They are treated with manganous chloride, and the resulting gases are passed through potassium iodide and then into a Hempel's burette. The amount of nitric oxide, gives the amount of nitrate present, and the chlorate is estimated by deducting from the total chlorine liberated that due to the reduction of the nitrate.

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, June 15.—Dr. Armstrong, President, in the chair.—The following papers were read:—Contributions to our knowledge of the aconite alkaloids. Part vi. Conversion

of aconitine into isaconitine, by W. R. Dunstan and F.H. Carr. On heating the hydrobromide of the highly poisonous aconitine it is converted into the corresponding salt of its non-poisonous isomeride, isaconitine.—Part vii. Some modifications of aconitine aurichloride, by W. R. Dunstan and H. A. D. Jowett. Aconitine aurichloride may be obtained in three different physically isomeric modifications, melting at 135° 5', 152°, and 176° respectively.—Note on the stereoisomerism of nitrogen compounds, by S. U. Pickering.—A study of the properties of some strong solutions, by S. U. Pickering. The depressions of the freezing points of water, acetic acid, and benzene, by a number of organic non-electrolytes, indicate in all cases the formation of compounds of the solvent with the dissolved substance.—Studies on citrazinic acid, by W. J. Sell and T. W. Easterfield. The authors propose provisional formulæ for citrazinic acid and a number of allied compounds as the result of their work on the subject.—The essential oil of hops. Preliminary notice, by A. C. Chapman. A dextro-rotatory sesquiterpene C₁₅H₂₄, is obtained by the steam distillation of hops.—The sulphides and polysulphides of ammonium, by W. P. Bloxam. The author has obtained a number of crystalline double ammonium sulphides of the general formula (NH₄)₂S, xNH₄SH.—Sarcocollactic acid obtained by fermentation of inactive lactic acid, by P. Frankland and J. MacGregor.—Hexanitroammonium, by A. G. Perkin.—The constituents of the Indian dye-stuff kamala, I., by A. G. Perkin. On extraction with ether, kamala yields rottlerin, C₁₁H₁₀O₃, isorottlerin, two resins C₁₂H₁₂O₃ and C₁₃H₁₂O₄ and a small proportion of a yellow colouring matter.—A quantitative method of separating iodine from chlorine and bromine, by D. S. Macnair. The method is based on the fact that, when treated with chromic acid mixture, silver iodide is converted into the iodate whilst silver chloride and bromide are converted into the sulphates.—No e on a form of burette for rapid titration, by L. Garbutt.—The use of sodium peroxide as an analytical agent, by J. Clark. By heating powdered minerals with sodium peroxide, the arsenic and sulphur may be rendered soluble.—Stibioantalite, a new mineral, by G. A. Goyder.—The colouring matter of *Drosera Whittakeri*, II., by E. Rennie. The author has extended his previously published work on this subject.—Preparation of mono-, di-, and tri-benzylamine respectively may be obtained as the chief products of the interaction of benzyl chloride and ammonia, by varying the quantity of the latter.—Piazine (pyrazine) derivatives, II., by A. T. Mason.—Piazine derivatives, III., by A. T. Mason and L. A. Dryfoos. In these two papers the authors describe a number of new substituted piazines and their dihydrides.—Condensation products from ethylenediamine and derivatives of acetoacetic acid, IV., by A. T. Mason and L. A. Dryfoos.—Studies of the oxidation products of turpentine, by S. B. Schryver. The author assigns to terpenylic acid the formula



—Addendum to note on the nature of depolarisers, by H. E. Armstrong.—The molecular complexity of liquids, by W. Ramsay and J. Shields. The authors deduce the molecular weights of liquids from their surface tensions.—The preparation of active amyl alcohol and active valeric acid from fusel oil, by W. A. C. Rogers. By repeatedly heating fusel oil with fuming hydrochloric acid, pure laevo-rotatory amyl alcohol ([α]_D = -5.2°) is obtained; by oxidising the alcohol, active valeric acid may then be prepared.—On the occasion of the Rothamstead jubilee, July 29 last, an address was presented to Sir J. Lawes and Dr. Gilbert by the President and Council of the Chemical Society.

PARIS.

Academy of Sciences, September 18.—M. de Lacaze-Duthiers in the chair.—On the teeth of hyperboloidal gearing, by M. H. Resal.—The shooting stars of the month of August, 1893, observed in Italy, by P. Francis Denza. Reports received from members of the Meteorological Association in all parts of Italy show that the August showers were observed under comparatively favourable conditions. The number of meteorites observed grew progressively from the first to the eleventh of the month, and the phenomenon exhibited on the latter date a greater brilliancy than usual. The maximum took place earlier than in previous years, and the greater density of

the shower indicates a corresponding increase in the density of the meteorite swarm. The principal radiant was near η Persei, about R.A. 44°, Decl. + 55°. The steady annual displacement of the Perseid radiant and the unusual brilliancy of the swarm makes an interesting subject for future observation.—Circles or spheres “derived” from an envelope, plane or solid, of any class, by M. Paul Serret.—On the periodical maxima of spectra, by M. Aymonnet. It may be assumed that luminous waves comprising an exact number of molecular ranges are propagated with less friction than waves producing nodes in the molecules themselves. If, between two given limits, the incident radiation is sufficiently complex and intense, and the solid transmits all the maximum waves possible, these will, in the normal spectrum, differ in wave-length by twice the product of the index of refraction into the sum of the molecular diameter at absolute zero, its expansion at the given temperature, and its lengthening or shortening in the direction of propagation under the influence of the wave.—On the development of the pancreas in Ophidia, by M. G. Saint-Remy. The earliest stage observed in the snake, corresponding, as far as the pancreas is concerned, to the fifth day in the development of the chicken, shows distinctly the three markings, one dorsal and two ventral, observed in some other vertebrates. The ventral markings are completely isolated from the intestine, and detach themselves from the hepatic canal, forming two clusters of acini on the two sides. The dorsal marking, which is very voluminous, lies to the right of the duodenum, with which it communicates by a broad canal. It was this that was previously observed. The close connection between the hepatic canal and the pancreas is easily understood by observing the development of the latter from the three markings referred to.—On the coccidia of birds, by M. Aiphonse Labbé. In the course of researches on parasites of the blood of birds, conducted at Roscoff, the presence of an intestinal coccidium, probably unknown hitherto, was verified in a large number of aquatic birds. It is a very small tetraspore coccidium with exogenous development. The pyriform capsule is not larger than 16 or 18 μ by 14 or 16 μ . An interesting characteristic is the frequent presence of two bright granules at the micropylar extremity. The presence or absence of polar granules in *Coccidium Roscoviense* appears to be determined by the culture in which the cysts were developed.—Vegetable anatomy of *Ataccia Cristata*, Kunth, by M. C. Queva.

SYDNEY.

Royal Society of New South Wales, June 7.—Prof. T. P. Anderson Stuart, President, in the chair.—The following papers were read:—Flying machine motors and cellular kites, by Lawrence Hargrave.—Notes and analysis of a metallic meteorite from Moonbi, near Tamworth, N.S.W., by John C. H. Mingaye.—Plants with their habitats, discovered to be indigneous to this colony since the publication of the “Handbook of the Flora of New South Wales,” by Charles Moore.—On the whipworm of the rat’s liver, by T. L. Bancroft.—Small whirlwinds, by H. C. Kiddle.

July 5.—Prof. T. P. Anderson Stuart, President, in the chair.—The following papers were read:—On the languages of the New Hebrides, by Sidney H. Ray.—On an approximate method of finding the forces acting in magnetic circuits, by Prof. Threlfall.—Unrecorded genera of the older tertiary fauna of Australia, including diagnoses of some new genera and species, by Prof. Ralph Tate.

DIARY OF SOCIETIES.

LONDON.

WEDNESDAY, OCTOBER 4.

ENTOMOLOGICAL SOCIETY, at 7.—On the Cost and Value of Insect Collections: Dr. D. Sharp, F.R.S.—On the Ants of the Island of St. Vincent: Prof. Auguste Förel.—Description of a New and Remarkable Sub-family of the Scolytidae: Walter F. H. Blandford.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—University College, Bristol, Calendar for the Session 1893-94 (Bristol).—The Miner’s Handbook: Prof. J. Milne (Lockwood).—Elementary Lessons, with Numerical Examples in Practical Mechanics and Machine Design, new edition: R. G. Blaine (Cassell).—The Orchid Seekers: A. Russan and F. Boyle (Chapman and Hall).—On Sewage Treatment and Disposal: T. Wardle (J. Heywood).—The Cholera Epidemic of 1892 in the Russian Empire: Dr. F. Clemow (Longmans).—Proceedings and Transactions of the Royal Society of Canada, 1892 (Ottawa,

Durie).—A B C Five-Figure Logarithms for General Use: C. U. [Woodward (Spon)].—Our Household Insects: E. A. Butler (Longmans).—The Essentials of Chemical Physiology: Dr. W. D. Halliburton (Longmans).—The Art of Projection and Complete Magic-Lantern Manual: An Expert (Beckett).—Songs in Springtime, 2nd edition: J. C. Grant (E. W. Allen).—Notes on Some of the More Common Diseases in Queensland in Relation to Atmospheric Conditions, 1887-91: Dr. D. Hardie (Brisbane, Beal).—Charts for ditto (Brisbane, Beal).—Manual of the New Zealand Coleoptera, Parts 5, 6, 7: Captain T. Broun (N.Z., Wellington, Costall).—An Examination of Weismannism: Dr. G. J. Romanes (Longmans).—The Science of Mechanics: Dr. E. Mach, translated by T. J. McCormack (Watts).—A Course of Practical Chemistry or Qualitative Chemical Analysis, 8th edition: W. J. Valentin, edited and revised by W. R. Hodgkinson (Churchill).—Drum Armatures and Commutators: F. M. Weymouth (*Electrician Company*).—Handbuch der Paläozoologie, I. Abthg., Paläozoologie, iv. Band, 2 Lief: K. A. Zittel (Williams and Norgate).—Traité des Gîtes Minéraux et Métallifères, 2 vols.: E. Fuchs and L. de Launay (Paris, Baudry).—Abnormal Man, being Essays on Education and Crime and Related Subjects: A. MacDonald (Washington).—British Commerce and Colonies: H. de B. Gibbins (Methuen).—The Chemistry of Fire: M. M. P. Muir (Methuen).—A Manual of Electrical Science: G. J. Burch (Methuen).—A Treatise on the Kinetic Theory of Gases, 2nd edition: Dr. H. W. Watson (Oxford, Clarendon Press).—A Handbook of the Destructive Insects of Victoria, Part 2: C. French (Melbourne, Brain).—Glasgow and West of Scotland Technical College Calendar for Session 1893-94 (Glasgow).—Sécheresse, 1893, ses Causes, Principes Généraux de Météorologie, l’Abbé A. Fortin (Paris, Vic et Amat).—Blackie’s Junior School Shakespeare: King Henry V.: W. Barry (Blackie).—Blackie’s Science Readers, No. VI.: Rev. T. Wood (Blackie).—Hand und Hilfsbuch zur Ausführung Physiko-Chemischer Messungen: Prof. W. Ostwald (Williams and Norgate).—Text-book of Biology: Part 2, Invertebrates and Plants: H. G. Wells (Clive).—Certain Climatic Features of the Two Dakotas: J. P. Finley (Washington).—The Industries of Animals: F. Houssay (W. Scott).—Utility of Quaternions in Physics: A. McAulay (Macmillan).—Pubblicazioni della Specola Vaticana, fasc. 1 and 2 (Roma).

PAMPHLETS.—A Guide to Stereochemistry: A. Eiloart (N.Y., Wilson).—The Caradoc Record of Bare Facts, 1892 (Shrewsbury).—Cremation and Cholera: Sir S. Wells (London).—The Prevention of Preventible Disease: Sir S. Wells (Glasgow).—Abstract of the Proceedings of the Linnaean Society of New York for the Year ending March 1, 1893 (New York).—On the so-called Bugonia of the Ancients, and its Relation to Eristalis Tenax, a Two-winged Insect: C. R. Osten-Sacken (Firenze, Ricci).—Catalogue of the Minerals of Tasmania, with Notes on their Distribution: W. F. Peterd (Hobart, Grahame).—The Glacier Epoch of Australasia: R. M. Johnston.—Abhandlungen zur Landeskunde der Provinz Westpreussen, Heft 5, Die Tucheler Haide, &c.: R. Schütte (Danzig, Bertling).—Notes on Marine Laboratories of Europe: B. Dean.

SERIALS.—Engineering Magazine, September (New York).—Insect Life, Vol. v. No. 5 (Washington).—The American Naturalist, August (Philadelphia).—Verhandlungen des Deutschen Wissenschaftlichen Vereines zu Santiago, Chile, ii. Band, 5 and 6 Heft (Berlin, Friedländer).—American Journal of Science, September (New Haven).—Journal of the Franklin Institute, September (Philadelphia).—Quarterly Journal of Microscopical Science, September (Churchill).—Economic Journal, September (Macmillan).—Timehri, June (Stanford).—Proceedings of the Liverpool Geological Society, Session 34, Part 1, Vol. vii. (Liverpool).—Transactions of the Academy of Science, St. Louis, Vol. vi. Nos. 2 to 8 (St. Louis).

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