SCIENTIFIC SERIALS.

Bulletin of the American Mathematical Society, April.—Prof. F. N. Cole gives an abstract of the *Proceedings* of the February meeting of the Society. For nearly a year plans have been under discussion for providing facilities for the publication of the increasing number of original mathematical papers produced in America. The Committee appointed at the last summer meeting have reported that it is desirable and feasible that the Society should undertake the periodical publication of *Transactions*, and that a commencement should be made in January 1900.—Nineteen papers were presented at the meeting.—Abstracts are given of papers by Prof. Macfarlane (on the imaginary of geometry), by Prof. Osgood (on a means of generating a function of a real variable whose derivative exists for every value of the argument, but is not integrable), by Prof. Lovett (on a certain class of invariants), by Dr. Snyder (lines of curvature on annular surfaces having two spherical directrices), by Dr. Miller (on the primitive groups of degree 17), by Dr. Dickson (concerning the abelian and hypo-abelian groups), by Mr. Hedrick (on three-dimensional determinants), and by Dr. Ling (an examination of groups whose orders lie between 1093 and 2000).—Prof. Webster exhibited a large number of curves traced by the motion of a rotating top.—Prof. J. M. Peirce follows the above notice with an abstract of his paper on determinants of quaternions, read at the above meeting.—The largest linear homogeneous group with an invariant pfaffian, by Dr. L. E. Dickson, was read at the October meeting of the Society.—Asymptotic lines on ruled surfaces having two rectilinear directrices, by Dr. Snyder, was communicated (partially) at the August and December meetings. There are several diagrams. The theorem discussed is every ruled surface contained in a linear complex has an asymptotic line, all of whose tangents belong to the complex (*cf.* Clebsch, "Ueber die Curven der Hauptstangenten bei windschiefen Flächen," *Crelle*, vol. lxviii.; and Bonnet, "Théorie générale des Surfaces," *Journ. de l'École Polytechnique*, vol. xxxii.).—There are reviews of "Theoretical and Practical Graphics," by F. N. Willson, of "The repertorio di matematiche superiori, i. Analisi per E. Pascal," and of "D'Ocagne's Cours de Géométrie descriptive et de Géométrie infinitésimale." The last two notices are by Prof. Lovett, who also contributes a translation of Prof. G. Darboux's obituary sketch of Sophus Lie (*Comptes rendus*, February 27).—Interesting notes and publications close the number.

Bollettino della Società Sismologica Italiana, vol. iv., 1898, No. 8.—Obituary notice of P. Landi.—On the different methods of determining the position of the epicentre in distant earthquakes of unknown origin, by G. Agamennone and F. Bonetti. The authors argue that methods which depend on the length of the interval between the two series of undulations and on their direction cannot give trustworthy results. They prefer one based on the time-records of a particular phase of the movement, and they would make use of the slow-period pulsations rather than the earlier tremors, since the latter may traverse the body of the earth with a velocity depending on the density, while the former travel along the surface with a nearly constant velocity.—Two-component seismoscope, by C. Guzzanti.—Notices of the earthquakes recorded in Italy (November 27–December 31, 1897), by G. Agamennone, the most important being the Umbria and Marches earthquake of December 18–22.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 20.—"Studies in the Morphology of Spore-producing Members. IV. Leptosporangiate Ferns." By F. O. Bower, Sc.D., F.R.S., Regius Professor of Botany in the University of Glasgow.

An attempt has been made in this memoir to strengthen the characters derived from the sorus by a fresh examination of its details, and certain of its features are used for purposes of general comparison which have hitherto received little attention; they are:—

(1) The relative time of appearance of sporangia of the same sorus.

(2) Certain details of structure of the sporangium, including its stalk.

(3) The orientation of the sporangia relatively to the whole sorus.

(4) The potential productiveness of the sporangium as estimated by its spore-mother cells, and the actual spore-output.

Observations of these features extending over all the more important living genera, coupled with data of habit and the characters of the Gametophyte as collateral evidence, have led the author to divide the homosporous ferns thus:—

Simplices	Marattiaceæ Osmundaceæ Schizæaceæ Gleicheniaceæ Matonineæ	Eusporangiate
Gradatæ	Loxsomaceæ Hymenophyllaceæ Cyatheaceæ Dicksonieæ Dennstaedtiinæ	Leptosporangiate
Mixtæ ...	The bulk of the Polypodiaceæ	Leptosporangiate

The effect of the observations and comparisons in this memoir is rather confirmatory of the current classifications than disturbing. The divisions suggested would supersede those of Eusporangiatæ and Leptosporangiatæ, though these terms would still be retained in a descriptive sense. If the sub-orders Osmundaceæ, Schizæaceæ, and Marattiaceæ be transferred from the end of the Synopsis Filicum to the beginning, and grouped with *Gleichenia* and *Matonia*, we have the "Simplices" before us. They are characterised by the simultaneous origin of the sporangia. The Gradatæ, in which the sporangia are produced in basipetal succession, include the Cyatheaceæ, Dicksonieæ (*Excl. Dennstaedtia*), Hymenophyllaceæ, and Loxsomaceæ, sequences probably of distinct descent, and probably derivative from some prior forms such as the Simplices; and in the arrangement of Sir Wm. Hooker they hold a position following on the Gleicheniaceæ. The family of Dennstaedtiinæ, founded by Prantl to include *Dennstaedtia* and *Microlepia*, also has its place here, but it leads on by intermediate steps to undoubtedly mixed forms in which various ages of sporangia appear without regular sequence, such as *Davallia*, *Cystopteris*, *Lindsaya*, and the Pterideæ. But this sequence is already laid out in this order in the Synopsis, and it illustrates one at least of the lines along which mixed forms are believed to have been derived from the Gradatæ. No attempt has been made to follow the natural grouping of the Mixtæ into detail, or to test the arrangement of them in the Synopsis. Sufficient has, however, been said to show that the systematic divisions of the ferns now proposed fall in readily with the system of Sir William Hooker, notwithstanding that they are based upon details of which he cannot have been aware.

"The Physiological Action of Choline and Neurine." By F. W. Mott, M.D., F.R.S., and W. D. Halliburton, M.D., F.R.S.

The cerebro-spinal fluid removed from cases of brain atrophy after death or during life, particularly from cases of general paralysis of the insane, produces when injected into the circulation of anæsthetised animals a fall of arterial pressure, with little or no effect on respiration. This pathological fluid is richer in proteid matter than the normal fluid, and among the proteids, nucleo-proteid is present. The fall of blood pressure is due to an organic substance, which by chemical methods was identified as choline.

The nucleo-proteid and choline originate from the disintegration of the brain tissue, and their presence indicates that some of the symptoms of general paralysis may be due to auto-intoxication; these substances pass into the blood, for the cerebro-spinal fluid functions as the lymph of the central nervous system. We have identified choline in the blood removed by venesection from these patients during the convulsive seizures which form a prominent symptom in the disease.

Normal cerebro-spinal fluid does not contain nucleo-proteid or choline, and produces no effect on arterial pressure.

Our proof that the material we have worked with is choline rests not only on chemical tests, but also on the evidence afforded by physiological experiments; the action of the cerebro-spinal substance exactly resembles that of choline. Neurine, an alkaloid closely related to choline, is not present in the fluid;

its toxic action is much more powerful, and its effects differ from those of choline.

The fall of blood pressure is in some measure due to its action on the heart, but is also produced by dilatation of the peripheral vessels, especially in the intestinal area. The drug causes a marked contraction of the spleen, followed by an exaggeration of the normal curves, due to the alternate systole and diastole of that organ.

The action on the splanchnic vessels is due to the direct action of the base on the neuro-muscular mechanism of the blood vessels themselves.

The fall of blood pressure is abolished by atropine. This observation has some bearing on general paralysis, for the arterial tension in that disease is usually high, not low, as it would be if choline were the only toxic agent at work.

Neurine produces a fall of arterial pressure, followed by a marked rise, and a subsequent fall to the normal level. Sometimes, especially with small doses, the preliminary fall may be absent. Sometimes, especially with large doses, by which presumably the heart is more profoundly affected, the rise is absent.

The slowing and weakening of the heart account for the preliminary fall of blood pressure.

The rise of blood pressure which occurs afterwards is due to the constriction of the peripheral vessels, evidence of which we have obtained by the use of oncometers for intestine, spleen, and kidney.

After the influence of the central nervous system has been removed by section of the spinal cord, or of the splanchnic nerves, neurine still produces its typical effects.

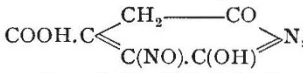
After, however, the action of peripheral ganglia has been cut off by the use of nicotine, neurine produces only a fall of blood pressure. It therefore appears that the constriction of the vessels is due to the action of the drug on the ganglia.

It produces a marked effect on the respiration. This is first greatly increased, but with each successive dose the effect is less, and ultimately the respiration becomes weaker, and ceases altogether. The animal can still be kept alive by artificial respiration.

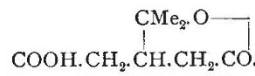
The exacerbation of respiratory movements will not account for the rise of arterial pressure; the two events are usually not synchronous, and an intense rise of arterial pressure may occur when there is little or no increase of respiratory activity or during artificial respiration.

After atropine, injection of neurine causes only a rise of blood pressure, which is accompanied with constriction of peripheral vessels.

Chemical Society, April 20.—Prof. Thorpe, President, in the chair.—The following papers were read:—The synthesis of some $\beta\beta'$-dipyridyl derivatives from citrazinic acid, by W. J. Sell and H. Jackson. Citrazinic acid yields a nitroso-derivative



from which a number of dipyridyl derivatives have been obtained.—Action of hydrogen peroxide on carbohydrates in the presence of iron, by R. S. Morrell and J. M. Crofts. Both glucose and lævulose are oxidised by hydrogen peroxide in presence of iron salts with formation of glucoson; under similar conditions, arabinose yields arabinoson.—The condensation of oxalic acid and resorcinol, by J. T. Hewitt and A. E. Pitt. The condensation product of oxalic acid with resorcinol in presence of sulphuric acid contains a compound of the composition $C_{20}H_{14}O_7$, which is probably a carboxylic acid.—Ethyl ammonium sulphite, by E. Divers and M. Ogawa. Ethyl ammonium sulphite is formed by the interaction of ammonia and sulphur dioxide dissolved in alcohol; it is immediately converted into alcohol and ammonium pyrosulphite by water.—Ethyl ammonium selenite and non-existence of amidoselenites (selenosamates), by E. Divers and S. Hada.—The allotropic modifications of phosphorus, by D. L. Chapman. Metallic and red phosphorus are identical, and the vapours of red and yellow phosphorus are also identical; red phosphorus melts, forming ordinary phosphorus, under pressure at the melting point of potassium iodide.—On the interaction of mercurous and mercuric nitrites with the nitrites of silver and sodium, by P. C. Rây.—β-Isopropylglutaric acid, by F. H. Howles and J. F. Thorpe. A new method of preparing β-isopropylglutaric acid from ethylic α-bromisobutylacetate is given.—The synthesis and preparation of terebic and terpenylic acids, by W. T. Lawrence. β-Isopropylglutaric acid is oxidised by chromic acid mixture with formation of terpenylic acid; the constitution of the latter is therefore



—Position-isomerism and optical activity; the comparative rotatory powers of methylic and ethylic ditoluylglycerates, by P. Frankland and H. Aston.—Fencholenic acid, by G. B. Cockburn. Fenchonoxime, when heated with dilute sulphuric acid, yields a mixture of two nitrites, which in turn give isomeric acids on hydrolysis.—The action of certain acidic oxides upon salts of hydroxy-acids, Part iv., by G. G. Henderson, T. W. Orr, and R. J. G. Whitehead.

Royal Microscopical Society, April 19.—Mr. E. M. Nelson, President, in the chair.—The President called special attention to two old microscopes; the first, which had been presented to the Society by Mr. J. M. Offord, was signed "Adams," and was a very interesting model which filled up a gap in the historic collection of the Society. Its probable date was about 1785-95. The second microscope, which had been presented by Dr. Dallinger, was one full of interest, and evidently constructed about the end of the last century; it was the earliest example in the Society's collection of a microscope with rack-work limb.—Dr. Hebb exhibited, on behalf of Miss Latham, two slides of blood which had been stained with methylen blue; one was of normal blood which had retained the blue stain, the other was of blood from a diabetic person; but in this the blue had been discharged, probably by the action of the glucose which is present in the blood in this disease.—Owing to illness Prof. Lionel Beale was unable to be present to read his paper.—Dr. Hebb read a letter from Mr. Bryce Scott, who said if any Fellows cared for West India dredgings rich in Foraminifera, he would be pleased to forward them some.—The President then, on behalf of the Society, presented to Mr. T. H. Powell an enlarged framed copy of the portrait of his father, the late Mr. Hugh Powell, which is issued as a frontispiece in the current number of the *Journal*.—The President then made a few remarks upon the theory and construction of eye-pieces for the microscope.—At the next meeting it is hoped Dr. H. C. Sorby will read a paper on the preparation of microscopical specimens of marine worms, and that there will be an exhibition of pond-life.

PARIS.

Academy of Sciences, May 1.—M. van Tieghem in the chair.—On continued groups, by M. H. Poincaré.—Iodine in sea water, by M. Armand Gautier. Iodine does not appear to exist in sea water in the form of iodides, since five litres gave a negative result. It would appear to be present in minute organisms, and amounts up to 2·4 mgr. per litre were found from this source. One-fourth of the total amount of iodine present can be separated by filtering through porcelain.—On traumatism and tuberculosis, by MM. Lannelongue and Achard.—Separation into two natural groups of the volcanic outflow of Mt. Dore; the distinctive chemical characters of their magmas, and of that supplying the eruptions of the "puys" of Auvergne, by M. Michel Lévy.—On a generalisation of Fermat's theorem, by M. L. E. Dickson.—On a transcendental equation and linear differential equations of the second order with periodic coefficients, by M. A. Liapounoff.—Note on the development of an arbitrary function and on a series proceeding according to harmonic functions, by M S. Zaremba.—Radioconductors with metallic spheres, by M. Edouard Branly. Columns of from six to fifteen balls of various metals were placed in series with a battery and electric bell. On exposing this column to the electric waves arising from a small induction coil, brusque variations of resistance are set up, causing the bell to ring. Thus with steel the resistance under these conditions fell from 2060 ohms to 120 ohms, with aluminium from 20,660 to 280 ohms, the resistance being in both cases restored by giving a slight shock to the column.—The production of chains of electrolytic deposits, and the probable formation of invisible conducting chains in distilled water under the action of induced currents and electric waves, and on a curious oscillation phenomenon produced in distilled water by induced currents of low frequency, by M. Thomas Tommasina.—On the magnetic rotatory polarisation of quartz, by M. Arnold-Borel.—Chemical analysis of some volcanic rocks arising

from the peripheral cracking of Mt. Dore, by M. E. Bonjean. Eleven analyses are given of phonolites, trachytes, tephrites, and basalts.—On a crystallised double carbonate of cerium peroxide, by M. André Job. The salt has the composition $Ce_2O_3.(CO_3)_3.4K_2CO_3.12H_2O$, and arises from the action of hydrogen peroxide upon cerium salts, and also by spontaneous oxidation.—On a fluorine compound supposed to be contained in certain mineral waters, by M. F. Parmentier. The effects produced upon glass, hitherto supposed to have been produced by fluorides in certain mineral waters, are shown to be due to a deposit of silica. No trace of fluorine has been detected in numerous analyses of mineral waters.—On the oxidising power of the alkaline periodates, by M. E. Péchard. The salt $NaIO_4$ behaves as an oxidising agent towards ferrous salts and potassium iodide.—Displacement of mercury by hydrogen, by M. Albert Colson. Mercuric oxide is slowly reduced by hydrogen at 100°, the amount of mercury formed being proportional to the weight of oxide actually present. The yellow and red oxides are reduced at different rates, the red being the slower of the two. Mercurous oxide is not attacked by hydrogen at 100°.—Luminous phenomena produced by the action of certain ammoniacal salts upon fused potassium nitrite, by M. D. Tommasi.—Morphine and its salts, by M. Émile Leroy. A study of the heats of combustion and formation of various salts of morphine.—On the production of the racemoid forms of camphor, by M. A. Debierne.—On the unsymmetrical tetramethyl derivative of diamido-diphenylethane, by M. A. Trillat.—On the sugar from maize stems, by MM. C. Istrati and G. Oettinger.—On the absorption of iodine by the skin and its localisation in certain organs, by M. F. Gollard.—Detection and colorimetric estimation of minute quantities of iodine in organic substances, by M. Paul Bourcet.—The electrical treatment of gout, by M. Th. Guilloz.—On the structure of the anal glands in *Dysticus* and the supposed defensive *rôle* of these glands, by M. Fr. Dierckx.—Sporozoa in the digestive tube of the blind-worm, by M. Louis Léger.—On the quantitative variations of the plankton in the Lake of Geneva, by M. Emile Yung.—Fall of a meteorite recently observed in Finland, by M. Stanislas Meunier.—On a new mercury pump, by M. E. U. Chatelain.

DIARY OF SOCIETIES.

THURSDAY, MAY 11.

MATHEMATICAL SOCIETY, at 8.—The Zeroes of a Spherical Harmonic $P_n^m(\mu)$ considered as a Function of n: H. M. Macdonald.—On the Statistical Rejection of Extreme Variations, Single or Correlated (Normal Variation and Normal Correlation): W. F. Sheppard.

FRIDAY, MAY 12.

ROYAL INSTITUTION, at 9.—Magnetic Perturbations of the Spectral Lines: Prof. Thomas Preston, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 8.—Observations of Swift's Comet 1899, made at Grahamstown, South Africa: L. A. Eddie.—Observations of Mars made at Mr. Crossley's Observatory, Bermerside, Halifax, during the Opposition 1898–99: Joseph Gledhill.—Note on the Spectra of γ Cassiopeiæ and o Ceti: Rev. W. Sidgreaves.—Longitude from Moon Culminations: D. A. Pio.——*Probable Papers*: Note on an Elbow Form of Reflecting Telescope: Dr. A. A. Common, F.R.S.—Observations of the Satellite of Neptune from Photographs taken with the 26-inch Refractor of the Thompson Equatorial: Royal Observatory, Greenwich.

PHYSICAL SOCIETY, at 5.—Note on the Vapour Pressure of Solutions of Volatile Substances. Dr. R. A. Lehfeldt.—Note on the Discussion of their Paper on the Criterion for an Oscillatory Discharge of a Condenser: Prof. W. B. Morton and Dr. Barton.—Exhibition of a Quadrant Electrometer: G. L. Addenbrooke.

MALACOLOGICAL SOCIETY, at 8.—On *Planispira* (*Cristigibba*) *Buruensis* and *Omphalotropis hercules*, New Species from Buru: J. H. Ponsonby and E. R. Sykes.—Note on the Nervous System of *Ampullaria urceus*: R. H. Burne.—Notes on some Marine Shells from North-West Australia, with Description of New Species: E. A. Smith.—Descriptions of *Sigaretus Drewi*, n.sp. (Fossil) and *Cirsonella neozelanica*, n.sp. from New Zealand: R. Murdoch.—Notes on some New Zealand Land Mollusca: R. Murdoch.

SATURDAY, MAY 13.

GEOLOGISTS' ASSOCIATION (Liverpool Street, G.E.R.), at 2.—Excursion to Ilford.

MONDAY, MAY 15.

VICTORIA INSTITUTE, at 4.30.—The Physical and Mental Attributes of the Sexes: Dr. A. T. Schofield.

TUESDAY, MAY 16.

ROYAL INSTITUTION, at 3.—Recent Advances in Geology: Prof. W. J. Sollas, F.R.S.

ZOOLOGICAL SOCIETY, at 8.30.

ROYAL STATISTICAL SOCIETY, at 5.—Life Tables: their Construction and Practical Uses: T. E. Hayward.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Specimens of Work with Irregular Grained Screens, &c.

WEDNESDAY, MAY 17.

ROYAL METEOROLOGICAL SOCIETY, at 4.30.—The Mean Temperature of the Surface Waters of the Sea round the British Isles, and its Relation to that of the Air: H. N. Dickson.—Some Phenomena connected with the Vertical Circulation of the Atmosphere: Major-General H. Schaw, C.B.

ROYAL MICROSCOPICAL SOCIETY, at 7.30.—Exhibition of Pond Life.

THURSDAY, MAY 18.

ROYAL SOCIETY, at 4.30.—Bakerian Lecture: The Crystalline Structure of Metals: Prof. Ewing, F.R.S., and W. Rosenhain.——*Probable Papers*: The Yellow Coloring Matters accompanying Chlorophyll and their Spectroscopic Relations: C. A. Schunck, F.R.S.—The Diffusion of Ions into Gases: J. S. Townsend.—The Diurnal Range of Rain at the Seven Observatories in connection with the Meteorological Office, 1871–1890: Dr. R. H. Scott, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Electric Locomotives in Practice and Tractive Resistance in Tunnels, with Notes on Electric Locomotive Design: P. V. McMahon.

CHEMICAL SOCIETY, at 8.—Corydaline, Part VI.: Dr. J. J. Dobbie and A. Lauder.—Oxidation of Furfural by Hydrogen Peroxide: C. F. Cross, E. J. Bevan, and T. Freiberg.

FRIDAY, MAY 19.

ROYAL INSTITUTION, at 9.—Runic and Ogam Characters and Inscriptions in the British Isles: The Lord Bishop of Bristol.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Zur Anthropologie der Badener: O. Ammon (Jena, Fischer).—A Class-Book of (Elementary) Practical Physiology: Dr. de B. Birch (Churchill).—Geometrical Drawing: E. C. Plant, Vol. 1, Practical Plane Geometry (Macmillan).—Medical Missions in their Relation to Oxford: Sir H. W. Acland, 2nd edition (Frowde).—The Hygiene of the Mouth: R. D. Pedley (Segg).—Die Physikalischen Erscheinungen und Kräfte ihre Erkenntnis und Verwertung im Praktischen Leben: Prof. L. Grunmach (Leipzig, Spamer).—Outlines of Physical Chemistry: Prof. A. Reychler, translated by Dr. J. McCrae (Whittaker).—L'Éclairage a Incandescence par le Gaz et les Liquides Gazéifiés: P. Truchot (Paris, Carré).—Transactions of the American Pediatric Society, Vol. x. (New York).—Elements of Quaternions: Sir W. R. Hamilton, 2nd edition, Vol. 1 (Longmans).—Mechanics applied to Engineering: Prof. J. Goodman (Longmans).—Text-Book of Practical Solid Geometry: Captain E. H. de V. Atkinson (Spon).—Steinbruchindustrie und Steinbruchgeologie: Dr. O. Hermann (Berlin, Borntraeger).—The Naval Pioneers of Australia: L. Becke and W. Jeffery (Murray).—Applied Geology: J. V. Elsden, Part 2 ("Quarry" Publishing Company).—A Guide to Recent Large Scale Maps (London).

PAMPHLETS.—Mines and Quarries, General Report, &c., for 1898, Part 1 (London).—The Geology of the Country around Carlisle: T. V. Holmes (London).

SERIALS.—Travaux de la Société Impériale des Naturalistes de St. Pétersbourg, Vol. xxvii. livr. 5 (St. Pétersbourg).—Sunday Magazine, May (Isbister).—Good Words, May (Isbister).—Chambers's Journal, May (Chambers).—National Review, May (Arnold).—Contemporary Review, May (Isbister).—Pearson's Magazine, May (Pearson).—Century Magazine, May (Macmillan).—Proceedings of the American Philosophical Society, December (Philadelphia).—Humanitarian, May (Duckworth).

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