

114, but he omits the Universities of London, of Paris, of the State of New York and of Wales, and the New University of Brussels. Excluding the first three, which, being of the Napoleonic type, have no resident students, the undergraduate population of the Universities of the world is estimated by this academic statistician as amounting to 157,513 persons. Berlin is the most populous University, Urbino the smallest. The first has 7771 students, the latter only 74. In point of numbers Oxford comes tenth on the list; Cambridge, twelfth; Victoria, sixty-fourth, and Durham ninety-eighth.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society, March 21.**—"On the Development of the Branches of the Fifth Cranial Nerve in Man." By A. Francis Dixon.

In this paper "detailed descriptions of the fifth nerve branches are given for five different stages of the human embryo, beginning with an embryo of four weeks, at which time merely the three main divisions of the nerve are represented, and ending with one of the eighth week. The observations on the human embryo have been checked by further observations on rat embryos, and an almost complete correspondence between the two has been made out." In mammals, the three divisions of the fifth nerve are found to rise independently from the Gasserian ganglion, and the nasal nerve is found to be the first representative of the ophthalmic division, the frontal being formed later. In like manner, the inferior dental nerve represents the first formed inferior maxillary nerve, the lingual branch appearing later. No special ganglion is present either for the nasal or for the ophthalmic nerve in mammals in the sense of a ganglion of a posterior nerve root. The ciliary ganglion does not represent such a ganglion, and when first found is more closely connected with the fourth and frontal than with the third and nasal nerves. The fourth and frontal nerves from an early period are closely connected. At the beginning of the sixth week nearly all the named branches of the fifth nerve of the adult are represented in the embryo; also at this time the accessory ganglia of the fifth nerve are recognisable. No evidence was found to show that the cells of these smaller ganglia are derived directly from those of the Gasserian. None of the different nerves which in the adult connect the fifth with the other cranial nerves are to be considered branches of the fifth nerve; thus the chorda tympani and the Vidian are found to be derived from the facial, and the nerve of Jacobson from the Glossopharyngeal.

"On the Conditions affecting Bacterial Life in Thames Water." By Dr. E. Frankland, F.R.S.

Since May, 1892, the author has been making monthly determinations of the number of bacteria capable of development on a peptone-gelatin plate in a given volume of Thames water collected at the intakes of the metropolitan water companies at Hampton. The number of microbes per cubic centimetre of water varied during this time between 631 and 56,630, the highest numbers having, as a rule, been found in winter or when the temperature of the water was low, and the lowest in summer or when the temperature was high.

The complete observations demonstrate that the number of microbes in Thames water depends upon the rate of flow of the river or, in other words, upon the rainfall, and but slightly, if at all, upon either the presence or absence of sunshine or a high or low temperature.

With regard to the effect of sunshine upon bacterial life, the author remarks that the interesting researches of Dr. Marshall Ward leave no doubt that sunlight is a powerful germicide; but it is probable that its potency, in this respect, is greatly diminished, if not entirely annulled, when the solar rays have to pass through a stratum of water even of comparatively small thickness before they reach the living organisms. If this be the case, it is held to be no matter for surprise that the effect of sunshine upon bacterial life in the great mass of Thames water should be nearly, if not quite, imperceptible.

**Geological Society, April 3.**—Dr. Henry Woodward, F.R.S., President, in the chair.—Dr. K. de Krustchoff, St. Petersburg, was elected a Foreign Correspondent of the Society.—Physical features and geology of Mauritius, by Major H. de

Haga Haig, R.E. The author gave full details of the physical geography of the island, including the nature and composition of the mountain ranges, the depth of the ravines, the occurrence of caverns in the lavas, and the character of the coral reef surrounding the island. Information was furnished concerning the neighbouring islands, and reference made to the possible former existence of an extensive tract of land at no great distance from Mauritius.—On a comparison of the Permian freshwater Lamellibranchiata from Russia with those from the Karoo formation of Africa, by Dr. Wladimir Amalitsky, Professor of Geology in Warsaw University. The freshwater shells from the Russian Permian deposits belonging to the genus *Palæomutela* are also known from the Karoo beds of South and Central Africa, as pointed out by the author in 1892. He had recently had the opportunity of studying the actual specimens from the Karoo beds, and found in them species of the groups *Palæomutela Inostranzewi*, *P. Keyserlingi*, *P. Verneulii*, and *P. Murchisoni*; also of a new genus, the forms of which he had previously referred to *Naiadites*, Dawson. All these groups are found also in Russia, and a list was given of species found in the upper horizons (A, B, and C) of the Permian beds of Russia and in the Karoo beds. These upper beds of Russia have been determined by the author as the freshwater equivalents of the Zechstein; consequently the Beaufort beds of the Karoo series, if considered as the homotaxial equivalent of the European strata referred to above, should be regarded as Upper Permian. The Upper Permian group of freshwater lamellibranchiata of Russia, which bears traces of genetic relationship with the Carboniferous Anthracosidæ, and which was already well represented in Permo-Carboniferous and Lower Permian times, is, according to the author, much older than the African fauna of the Beaufort beds. These may be concluded to have migrated from Russia, the Gondwana beds of India having probably been the connecting-link between all these deposits. The author gave a description of the fossils of the Karoo series which he had examined, including a diagnosis of the new genus in which he placed the fossils already alluded to as having been previously referred to the genus *Naiadites*.

### PARIS.

**Academy of Sciences, April 8.**—M. Marey in the chair.—On the fluted spectrum, by M. H. Poincaré. A mathematical paper in which it is shown that a complete analysis of the phenomena of Fizeau and Foucault's experiment confirms Fizeau's deduction concerning the permanence of luminous movement during a large number of oscillations.—Official plans and reports relating to the removal of the capital of Brazil to a new site, by M. H. Faye. A series of reports printed in Portuguese and French. The district in which the proposed new site for a Brazilian capital is situated lies between the parallels 15° 40' and 16° 8' and the meridians 3° 18' and 3° 24' at an altitude of above 1000 metres.—Structure of the hymen in a species of *Marasmius*. An abstract of a memoir by M. J. de Seynes.—On substitutions, by M. Zochios. An algebraical paper.—Removal of the Brazilian capital. A letter to M. Faye, by M. Cruls. A short account of the main features of the survey work undertaken on the new site.—On geodetic work in the basin of the Amour, by M. Venukoff.—On the determination of the mass of the cubic decimetre of distilled water at 4°, by M. J. Macé de Lepinay. This datum is yet imperfectly determined. Shuckburg and Kater give 1000.480 grams, whereas Stampfer finds the value 999.653 grams. The author proposes a new method of determination by which he expects to determine this constant within 6 mgm. The proposed method includes (1) the study of the geometrical form and dimensions of a certain solid as related to the standard metre, (2) the measurement of the loss of weight of this solid immersed in pure air-free water at its temperature of maximum density in terms of the standard kilogram. The solid taken is a parallelepipedon formed of transparent quartz. Its thickness in different directions will be examined optically by means of Talbot's fringes.—New apparatus for the measurement of the specific inductive power of solids and liquids, by M. H. Pellat.—On a new form of spectroscope termed the "héma-spectroscope comparateur," by M. M. de Thierry. On a simple experiment demonstrating the presence of argon in atmospheric nitrogen, by M. Guntz. The author obtains argon by replacing magnesium by electrolytic lithium. Owing to the lower temperature at which lithium completely absorbs nitrogen, it is possible to pass atmospheric nitrogen over several heated

iron boats containing lithium, and collect argon over mercury at the exit end of the apparatus.—On the spectra of selenium and some natural selenides, by M. A. de Gramont. The minerals examined are: Berzélium  $Cu_2Se$ , Zorgite ( $PbCu_2$ ) Se, Clausthalite  $PbSe$ , Eucairite  $Cu_2Se$ ,  $Ag_2Se$ , Guanajuatite or Frenzelite  $Bi_2Se_3$ .—On the estimation of thiophene in benzene, by M. G. Denigès. Two methods are given, both depending on the use of the mercury reagent previously described. In aqueous solution the reagent precipitates the compound  $(SO_4)_2Hg(OH)_2 \cdot C_4H_4S$  when heated with the impure benzene in a closed flask at  $100^\circ$  for about fifteen minutes with frequent shaking. In methyl alcohol solution the precipitate  $SO_4(HgO)_2 \cdot Hg \cdot C_4H_4S$  is produced; in this case the benzene is miscible with the reagent, and hence the reaction is much facilitated.—On the action of potassium permanganate on various organic substances, by M. E. Maumené.—On the calcium phosphate of milk, by M. L. Vaudin. The conclusions are drawn that: (1) Milk contains citric acid as alkaline citrate, which aids in keeping its calcium phosphate in solution. (2) This solution occurs owing to the effect of lactose in preventing the precipitation of calcium citrate from solution. (3) Every influence modifying or destroying the molecular equilibrium of the salts dissolved in milk, tends to precipitate tricalcic phosphate together with calcium citrate.—The sandstone of Taveyannaz and its relationships with the "fysch," by MM. L. Duparc and E. Ritter.—On the calcium carbonate of lake-waters, by M. André Delebecque.—On the connection of latitudinal displacements of lines of barometric maxima with the movements in declination of the moon, by M. A. Poincaré. The mean atmospheric conditions are powerfully and regularly influenced by the moon at each tropical revolution, and at each revolution of the node.

## DIARY OF SOCIETIES.

LONDON.

THURSDAY, APRIL 18.

LINNEAN SOCIETY, at 8.—Observations on the Lorantheæ of Ceylon; F. W. Keeble.

FRIDAY, APRIL 19.

QUEKETT MICROSCOPIC CLUB, at 8.  
MALACOLOGICAL SOCIETY, at 8.

SATURDAY, APRIL 20.

GEOLOGISTS' ASSOCIATION (Cannon Street Station, at 2.30.—Excursion to Charlton. Director: T. V. Holmes.

MONDAY, APRIL 22.

MEDICAL SOCIETY, at 8.30.

TUESDAY, APRIL 23.

ROYAL INSTITUTION, at 9.—Alternating and Interrupted Electric Currents: Prof. G. Forbes, F.R.S.  
INSTITUTION OF CIVIL ENGINEERS, at 8.  
ROYAL HORTICULTURAL SOCIETY, at 1.—Conference on Primulas.  
ROYAL STATISTICAL SOCIETY (Royal United Service Institution), at 5.—Progress of Friendly Societies and similar Institutions during the Ten Years 1884-94: E. W. Brabrook.—Some Illustrations of Friendly Society Finance: Rev. J. Frome Wilkinson.  
ROYAL MEDICAL AND CHIRURGICAL SOCIETY, at 8.30.  
ROYAL PHOTOGRAPHIC SOCIETY, at 8.  
SOCIETY OF ANTIQUARIES, at 2.

WEDNESDAY, APRIL 24.

INSTITUTION OF MECHANICAL ENGINEERS (Royal United Service Institution), at 7.30.—Discussion of the Governing of Steam-Engines by Throttling and by Variable Expansion: Captain H. K. Sankey.—Third Report to the Alloys Research Committee: Prof. W. C. Roberts-Austen, C.B., F.R.S.

GEOLOGICAL SOCIETY, at 8.—On the Shingle Beds of Eastern East Anglia: Sir Henry H. Howorth, M.P., F.R.S.—An Experiment to illustrate the Mode of Flow of a Viscous Fluid: Prof. W. J. Sollas, F.R.S.—Supplementary Notes on the Systematic Position of the Trilobites: H. M. Bernard.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.

SOCIETY OF ARTS, at 8.

THURSDAY, APRIL 25.

ROYAL SOCIETY, at 4.30.

ROYAL INSTITUTION, at 3.—The Liquefaction of Gases: Prof. J. Dewar, F.R.S.

CAMERA CLUB, at 8.15.—Photo-etching Printing: Leon Warnerke.

NUMISMATIC SOCIETY, at 7.

CHEMICAL SOCIETY, at 8.—The Action of Nitrosyl Chloride on Amides: Prof. Tilden, F.R.S., and Dr. M. O. Forster.—The Action of Nitrosyl Chloride on Asparagine and Aspartic Acid: Lævo-rotatory Chlorosuccinic Acid: Prof. Tilden, F.R.S., and H. J. Marshall.—On a Property of the Non-luminous Atmospheric Coal Gas Flame: L. T. Wright.—A Constituent of Persian Berries: A. G. Perkin and J. Geldard.—Potassium Nitrosulphate: E. Divers, F.R.S., and T. Haqa.—Diortho-substituted Benzoic Acids: Dr. J. J. Sudborough.—Hydrolysis of Aromatic Nitriles and Acid-amides: Dr. J. J. Sudborough.—Action of Sodium Ethylate on D-oxybenzoin: Dr. J. J. Sudborough.

INSTITUTION OF ELECTRICAL ENGINEERS (the Society of Arts), at 8.—A Magnetic Tester for Measuring Hysteresis in Sheet Iron: Prof. J. A. Ewing, F.R.S.

FRIDAY, APRIL 26.

ROYAL INSTITUTION, at 9.—The Effects of Electric Currents in Iron on its Magnetisation: Dr. John Hopkinson, F.R.S.

PHYSICAL SOCIETY, at 5.—A Theory of the Synchronous Motor: W. G. Rhodwell.—Note on a Simple Graphic Interpretation of the Determinantal Relation of Dynamics: G. H. Bryan.

CLINICAL SOCIETY, at 8.30.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Brine Pumping: Bernard Godfrey.

INSTITUTION OF MECHANICAL ENGINEERS (Royal United Service Institution), at 7.30.

EPIDEMIOLOGICAL SOCIETY, at 8.—Immunity: Dr. Washbourn.

SATURDAY, APRIL 27.

ROYAL INSTITUTION, at 3.—English Music and Musical Instruments of the Sixteenth, Seventeenth, and Eighteenth Centuries: Arnold Dolmetsch.

GEOLOGISTS' ASSOCIATION (St. Pancras Station), at 9 a.m.—Excursion to Brigstock, Geddington, &c. Directors: B. Thompson and W. D. Crick.

ROYAL BOTANIC SOCIETY, at 3.45.

## BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Field-Path Rambles: W. Miles, series 8 (Taylor).—Alembic Club Reprints—No. 11: Essays of Jean Rey (Edinburgh, Clay).—Results of Rain, River, and Evaporation Observations made in New South Wales during 1893: H. C. Russell (Sydney, Potter).—Progressive Revelation: E. M. Caillard (Murray).—The Schott Methods of the Treatment of Chronic Diseases of the Heart: Dr. W. B. Thorne (Churchill).—Wayside and Woodland Blossoms: E. Step (Warne).—Economic Classics: T. R. Malthus (Macmillan).—Problems and Solutions in Elementary Electricity and Magnetism: W. Slingo and A. Brooker (Longmans).—Lepidoptera of the British Isles: C. G. Barrett, Vol. 2 (L. Reeve).—Hydraulic Motors: G. R. Bodmer, 2nd edition (Whittaker).—Queen's College, Galway, Calendar for 1894-95 (Dublin, Ponsonby).—Stephen's Catechism of Practical Agriculture, new edition (Blackwood).—A Handbook to the Carnivora. Part 1: Cats, Civets, and Mongooses: R. Lydekker (Allen).—Science Readers: V. T. Murché, Books 1, 2, 3 (Macmillan).

PAMPHLETS.—Bacteriological Test of the Purity of Water: E. H. Hankin (Agra).—The Early Relations between Maryland and Virginia: J. H. Latané (Baltimore).—Report of the Rugby School Natural History Society, 1894 (Rugby).—Report of the Manchester Museum, Owens College, 1894 (Manchester).

SERIALS.—Engineering Magazine, April (Tucker).—Journal of the Royal Statistical Society, March (Stanford).—Journal of the Chemical Society, April (Gurney).—Journal of the Federated Institutes of Brewing, Nos. 1 and 2 (Harrison).—American Journal of Science, April (New Haven).—Journal of the Sanitary Institute, April (Stanford).—Science Progress, April (Scientific Press, Ltd.).—Bulletin de la Société d'Anthropologie de Paris, No. 9, 1894 (Paris, Masson).—Astrophysical Journal, April (Chicago).

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