A NEW departure in University Extension classes has been made at the Croydon centre, where a course of lectures on the "Geology and Scenery of the Alps" is being delivered by Miss M. M. Ogilvie, D.Sc. The course consists of ten lectures, six referring to general subjects bearing on the main question. Four lectures are devoted to special districts: the Western Alps, the Eastern Alps, the Bavarian Alps and North Tyrol, and the "Dolomites" of South Tyrol. The distribution of the population, political boundaries, trade routes, and many similar subjects controlled by the geology and physical geography are discussed. It is proposed to follow this course with an excursion to the Alps, during which various points discussed in the lectures will be studied on the ground.

MR. G. H. MORLEY informs us that the report that the late Mr. Thomas Avery, of Birmingham, bequeathed the sum of £2,000 to the Midland Institute, is incorrect. He left £2,000 to the Mason College, Birmingham, and only £1,000 to the Institute with which Mr. Morley is connected.

MR. F. W. DYSON has been appointed Prof. H. H. Turner's successor at the Royal Observatory, Greenwich. Mr. Dyson is a Fellow of Trinity College, and has held the Isaac Newton Studentship for the last two years.

WE learn from the Allahabad *Pioneer* that the Senate of the Madras University have reported unfavourably on the reference made to it by the Government regarding the proposal to establish degrees in science and agriculture.

SCIENTIFIC SERIALS.

Wiedemann's Annalen der Physik und Chemie, No. 2.—On kathode rays in gases at atmospheric pressure and in extreme vacua, by Philipp Lenard. This paper gives a detailed account of the behaviour of kathode rays when allowed to penetrate through a metallic screen in the walls of the vacuum tube into the air or other gas outside. It is shown that their behaviour is of a distinctive character, and largely independent of the electric forces producing them. Photographic plates were successfully employed in studying the distribution and divergence of the rays in air and other gases.—Concerning the theory of magnetic and electric phenomena, by Hermann Ebert. This is an attempt to show that by a consistent application of the cyclical theory of electric and magnetic phenomena, as illustrated by Fitzgerald's ether model, a complete and simplified explanation of these phenomena may be obtained.—On the laws of galvanic polarisation and electrolysis, by O. Wiedeburg. This is a detailed investigation of polarisation phenomena from the point of view of a theory which assumes that only a fractional portion of the ions clustering round the electrodes give rise to an opposing electromotive force. The author shows that this assumption leads to a complete and consistent representation of observed facts.—Some forms of immersed electrodes for measurements of electrolytic resistance, by F. Kohlrausch. The electrodes, which consist of small platinum plates about 1 sq. cm. in area, are soldered to platinum wires which are mounted in a double capillary tube. They are also surrounded by a glass vessel with a hole at the bottom for letting in the liquid. In measuring resistances they need only be immersed, no further adjustments or precautions being necessary.—Some experiments concerning the so-called waterfall electricity, by K. Wesendonck. The author quotes a large number of experiments elucidating the generation of electricity by the impact of water-spray, vapour, and air upon water and metallic conductors. Vapour impinging upon a water surface charges the latter positively, this being analogous to waterfall electricity, and independent of friction.—A new actinometer, by O. Chwolson. This consists of two thermometers placed close together, and is based upon the method of observing the changes in the difference of temperature of the two instruments, the warmer being in the shade, and the colder being exposed to the rays of the sun.

American Journal of Mathematics, vol. xvi. No. 1 (Baltimore, January.)—Zur Kettenbruchentwickelung hyperelliptischer und ähnlicher Integrale, by E. B. van Vleck (pp. 1–91), is illustrated by numerous diagrams, but we miss the usual useful index of contents accompanying long papers in this *Journal*.—Waves and jets in a viscous liquid, by Mr. A. B. Basset, F.R.S. (pp. 93–110), in continuation of an article by Prof. Greenhill, in the ninth volume, in which he discusses wave-motion in a frictionless liquid, here considers certain problems of like character when the viscosity of the liquid is taken into account.—Sur l'inversion des intégrales de fonction à multiplicateurs, by M. E. Picard (pp. 111–122), discusses in greater detail some points touched upon in chapter vi. of his memoir sur les fonctions algébriques de deux variables indépendantes (*Journal des Mathematiques*, 1889). On orthogonal substitutions that can be expressed as a function of a single alternate (or skew symmetric) Linear substitution, by H. Taber (pp. 123–130). This is a continuation of the author's previous work in the form of a proof of a theorem for certain orthogonal matrices discussed in a paper read by the writer at the Mathematical Congress in Chicago last year. The selected portrait is an excellent one (we feel sure) of Sophus Lie.

Symons's Monthly Meteorological Magazine, February, contains an article entitled "The January Frost." The author has tabulated all the lowest temperatures that he has been able to collect between the 5th and 8th of that month, and arranged them according to counties. The following are the minimum readings: Essex – 2°, Berwick – 3°, Aberdeen, Nottingham, and Warwick – 4°, York – 5°, Northumberland, Roxburgh, and Stirling – 6°, Fife and Perth – 8°, Forfar – 11°. In Ireland the temperature was higher, but still remarkable; between Cork and Tyrone several records were below 10°. A comparison with the great cold of January 1881 shows that that year was much more severe; the general mean for a number of representative stations was 3°·9, while this year it was 4°·7.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 8.—"Further Observations on the Organisation of the Fossil Plants of the Coal-Measures. Part I. *Calamites*, *Calamostachys*, and *Sphenophyllum*." By W. C. Williamson, LL.D. F.R.S., and D. H. Scott, M.A., Ph.D., F.L.S., F.G.S.

(1) *Calamites*.—The first part of the paper gives a detailed account of the vegetative structure of *Calamites*. It is proved that the primary structure of the young stem, before growth in thickness had begun, agreed in all essential points with that of an *Equisetum*, and thus the anatomical characters are found to completely confirm the supposed equisetaceous affinities of the genus. The true nature of the canals which accompany the vascular bundles in the internodes of *Calamites* is demonstrated, and their complete homology with the carinal canals of *Equisetum* established. In both cases the canal contains the disorganised protoxylem of the vascular bundle.

The development of the secondary tissues, which were always formed in *Calamities*, is traced in detail, and their origin from a normal cambium proved.

The formation of periderm in the cortex has also been clearly observed.

The position of the branches and their exact mode of connection with the tissues of the main stem is fully investigated. It is shown that many of the branches were abortive, and became enclosed in the wood.

The roots of *Calamites*, as M. Renault has proved, were identical with *Astromyelon*.

(2) *Calamostachys*.—The anatomy of the axis of the strobilus has been fully investigated, and found to agree in the main features, though not in details, with that of *Calamites* or *Equisetum*.

In general anatomical and morphological characters the homosporous species, *C. Binneyana*, and the heterosporous *C. Casheana* show the closest agreement, and only present minute differences. In *C. Binneyana*, developing spores, still grouped in tetrads, are frequently found. One or more members of each tetrad were usually abortive. The abortion of these spores must have allowed of an increased nutrition of the survivors, and thus have been of considerable physiological importance. In *C. Casheana* the micro- and macro-sporangia were borne on the same strobilus. The diameter of the macrospores is three times that of the microspores. The macrospores are constantly accompanied by abortive spores. This abortion of certain spores, involving the better nutrition of their sister-cells, appears to throw considerable light on the origin of heterospory within this genus.

This axis of the strobilus of *C. Casheana* has a well-marked zone of secondary wood, thus affording direct evidence of the occurrence of secondary growth in a heterosporous cryptogam.

The affinities of *Calamostachys* are fully discussed. The fructification is evidently Calamarian, and the relation to *Calamites* itself is a close one.

(3) *Sphenophyllum.*—As is well known, the slender jointed stem bore verticils of superposed leaves, the number of which, in each whorl was some multiple of 3. In *S. plurifoliatum*, the species first described, the leaves probably numbered 18 in a whorl. The primary wood was triarch and centripetal, and so far resembled that of certain Lycopodiaceæ, with which, however, the genus has otherwise little in common. Abundant secondary tissues were formed. The cambium can be clearly demonstrated, and occupies the normal position between wood and bast. Sieve tubes have been detected in the phloem of *S. insigne*. Internal periderm was formed, giving rise to a regular scale-bark.

The fructification of *Sphenophyllum*, as has been shown by M. Zeiller, is that previously described under the name of *Bowmanites Dawsoni*. The axis of the strobilus bore numerous whorls of partially coherent bracts. The very long sporangiaphores, each bearing a single recurved sporangium, arise from the upper surface of the whorl, two sporangiophores corresponding to each bract. The whole structure is quite unlike that of any other vascular cryptogam. The plant, so far as observed, was homosporous, and the alleged heterospory of another species is very doubtful. The genus is entirely isolated, and, though the structure is now completely known, its affinities cannot be determined until additional forms have been discovered.

March 1.—"Researches on the Structure, Organisation, and Classification of the Fossil Reptilia. Part IX. Section 1. On the Therosuchia." By H. G. Seeley, F.R.S.

This paper discusses the classification of reputed Permian and Triassic Reptilia which have been referred to the Anomodontia as Theriodonts.

Prof. Cope's definition of the Theriodontia as distinguished from the Anomodontia by characters of the post-orbital arch is regarded as unsupported by evidence. The author would limit the Theriodontia to animals which conform to Sir R. Owen's original definition based on the dentition (1876), and have temporal vacuities and a small quadrate bone.

It appears that there is a series of groups of South African Reptilia which agree in having a palate which has some resemblances to mammals but approximates to *Sphenodon*, lizards, and crocodiles. All these sub-orders are combined as the Therosuchia. In this order or group may be included the Deuterosauria from the Permian rocks of Russia.

The relation of the Therosuchia to other Anomodontia is shown in the following grouping:—

THEROSUCHIA.—Pareiasauria, Procolophonia, Gorgonopsia, Dinocephalia, Deuterosauria, Theriodontia (*Lycosauria, Cynodontia, Gomphodontia*), Endothiodontia [Theromora]. THEROCHELONIA.—Dicynodontia, Kistecephalia. MESOSAURIA.

"Researches on the Structure, Organisation, and Classification of the Fossil Reptilia. Part IX. Section 2. On the Reputed Mammals from the Karroo Formation of Cape Colony." By H. G. Seeley, F.R.S.

The author re-examines the remains of *Theriodesmus*, and contests the interpretation of the carpus given by Prof. Bardeleben, producing specimens of South African reptiles in which there is a single bone beneath the radius, as in *Theriodesmus*.

"Researches on the Structure, Organisation, and Classification of the Fossil Reptilia. Part IX. Section 3. On *Diademodon*." By H. G. Seeley, F.R.S.

The author describes fragments of jaws and teeth from Upper Karroo strata at Wonderboom and Aliwal North, collected by Messrs. R. D. Kannemeyer and Alfred Brown. They may possibly belong to more than one genus; but, in absence of sufficient knowledge of the skull to establish differences, the four species are referred to a new genus, *Diademodon*.

The teeth are highly specialised, but distinct in plan from *Tritylodon*, and from all known reptiles They closely approximate to some of the higher mammalia. The author refers *Diademodon* to a division of the Theriodontia in which the teeth become worn with use, which is named Gomphodontia.

Physical Society, February 23.—Prof. A. W. Rücker, F.R.S., President, in the chair.—A note on a new electrical theorem was read by Mr T. H. Blakesley. Two or more dispositions of electromotive forces in any network of conductors which produce at every part of the network the same currents, are defined as *equivalent systems*. The following theorem is then stated and proved: In any system of conductors possessing seats of electromotive force at any number of points, if any of these sources be moved along the various bars of the conducting system, and where a point of junction is encountered, each becoming a seat of the *same* electromotive force in *each* of the newly encountered bars, then the disposition at any moment is equivalent to that at any other moment, and therefore to the original disposition. Equivalent systems might also be defined as being such as produce equal expenditure of power in each part. From the above theorem the following propositions are deduced by the author: (1) That if any closed surface contains a portion of a network, then an electromotive force in any bar cutting the surface can be replaced by equal electromotive forces (in opposite directions as regards the surface) in all the other bars cutting the surface, without disturbing the current in any part of the network. (2) If two systems of electromotive forces be equivalent, one may be derived from the other.—Prof. C. V. Boys, F.R.S., read a note on the attachment of quartz fibres. When torsion fibres are required to carry large weights approaching the breaking weight, the ordinary method of attachment by shellac is not always satisfactory, for if the part of the fibre in the cement is twisted or bent, the yielding of the shellac causes uncertainty of zero. To avoid these troubles, Prof. Boys has devised and perfected a method of soldering the fibres, full details of which are given in the paper. After selecting a fibre of the right diameter and length, small weights are fixed on the ends by shellac. The end parts are then cleaned by dipping in strong nitric acid, washed, silvered, and electro-coppered. The weights are then cut off, and the coppered ends soldered to tags of tinned metal foil, chloride of zinc being used as a flux, and its capillarity serving to hold the ends to the tags whilst the latter are heated. The superfluous copper and silver are dissolved off by nitric acid, the tags and solder being protected by beeswax. After washing in boiling water the fibre is ready for use. Melted shellac is used for securing the tags to the torsion rod and suspended body. Several ingenious details of procedure to avoid capillary difficulties in the cleaning, plating, and washing processes are described in the paper. If fibres are required to conduct electricity, they are silvered and washed after the tags have been soldered on. Such fibres the author considers essential for making connection with electrometer needles of the greatest delicacy, for liquid connections are fatal to stability. Methods of rendering fibres visible by smoking with arsenic or magnesium are mentioned in the paper. At the meeting a perfectly circular hole, $\frac{1}{5000}$ of an inch in diameter, made by soldering round a quartz fibre passing through a hole in a metal plate, and then drawing out the fibre, was exhibited under a microscope. Mr. Inwards asked if the shellac used to secure the tags was melted or dissolved. Mr. Blakesley inquired if silvering fibres did not destroy their perfect elasticity. Dr. Sumpner wished to know if any data as to the relative torsional rigidity of silvered and unsilvered fibres had been obtained, and if the electric resistance of silvered fibres had been determined. Mr. Watson said silvered fibres had been successfully used in electrometers. As regards their torsion, he had found it differ from day to day, and the resistance varied enormously. In reply to question, Prof. Boys described the exact process of soldering the coppered fibre to the tags. As to the torsion of silvered fibres, he would not expect much increase, as the film was very thin. He also thought the elasticity would not be destroyed, for silver and gold make very good torsion wires.—Mr. Littlewood read a note on a method of determining refractive indices, particularly well adapted for either homogeneous or heterogeneous liquids. A vertical scale stands in the liquid contained in a vessel open at the top, and two marks on the part of the scale below the liquid are observed in succession through an inclined telescope capable of moving horizontally parallel to itself along a graduated bar. The horizontal distance between the two positions of the telescope in which the two divisions on the vertical scale are sighted is noticed, and the corresponding distance between the sighted position of two marks on the part of the scale above the liquid determined. When the length between the two marks on the scale in air is equal to that between those in the liquid, the ratio of the corresponding horizontal distances moved through by the telescope gives the index of refraction of a uniform liquid. For liquids in which the density varies in a vertical direction, observations of several points on the scale in the liquid enable the curved path of the light in the liquid to be traced out with considerable accuracy. The accuracy of the laws of diffusion might be tested in this way. The President said the method described was a novel and interesting way of picking out the layers of liquid of different refracting power.

Chemical Society, February 15.—Dr. Armstrong, President, in the chair.—The following papers were read:—The

analytical determination of probably available "mineral" plant food in soils, by B. Dyer. The author has made a series of determinations of the average acidity of the root sap of about 100 plants in order to measure the power of dissolving the mineral constituents of soils possessed by plants. These experiments seemed to indicate the suitability of a 1 per cent. solution of citric acid as an analytical soil solvent; the effect of this solution on a number of the Rothamsted soils was therefore tried. The conclusion is drawn that valuable indications of comparative ("mineral") soil fertility are obtained by the use of such a solution. After the reading of the paper, Sir Henry Gilbert gave a short sketch of the development of soil analysis.—The behaviour of the more stable oxides at high temperatures. Part ii., by A. A. Read. At 1750°, Sb_2O_5 is converted into Sb_2O_3, V_2O_5 into V_2O_3, and Fe_2O_3 into Fe_3O_4, whilst the oxides of cobalt and nickel are reduced to the metallic state.—The stability of the oxides considered in relation to the periodic law, by G. H. Bailey. In the even series of the periodic classification, the oxides are more stable the higher the atomic weight of the element concerned, the temperature of decomposition being taken as an index of stability; in the odd series the oxides become less stable as the atomic weight increases.—The interaction of benzil and benzylamine in presence of zinc chloride: a preliminary note, by F. R. Japp and W. B. Davidson. On heating benzil, benzylamine, and zinc chloride together at 100°, tetraphenylazine, benzyllophine, and dibenzyllophinium chloride are obtained.

Geological Society, February 16.—W. H. Hudleston, F.R.S., President, in the chair.—The Wollaston medal was awarded to Geheimrath Dr. Karl Alfred von Zittel, professor of geology and palæontology in the University of Munich, in recognition of the important services which he has rendered to palæontological science during a long period of time.—Mr. Aubrey Strahan was awarded the balance of the proceeds of the Wollaston Donation Fund, in token of appreciation of his geological work in several parts of England and on the Welsh border.—Mr. William Talbot Aveline received the Murchison medal, together with a sum of ten guineas, in recognition of the importance of his work as a geological surveyor.—The balance of the proceeds of the Murchison Geological Fund was handed to Mr. George Barrow, as a testimony of the value of his geological work both in Yorkshire and in Scotland.—The Lyell medal, with the sum of £46, was awarded to Prof. John Milne, F.R.S., of the Imperial College of Engineering, Tokio, Japan, in testimony of appreciation of his investigations in seismology.—The balance of the proceeds of the Lyell Geological Fund was presented to Mr. William Hill, in testimony of the value of his work amongst the Cretaceous rocks of this country during the last eight years.—A sum of £25 from the proceeds of the Barlow-Jameson Fund was given to Mr. Charles Davison, in token of appreciation of his work in geological dynamics, including under that term the study of earthquakes.—The President then read his anniversary address, which may be summarised as follows:—In continuation of the subject of the preceding anniversary address, relating to some recent work of the Geological Society, the remaining portion of the papers contributed within the septennial limits is classified under two groups. In the first group are placed papers descriptive of the newer palæozoic rocks, the older palæozoic rocks, and the fundamental rocks, and on general petrology, which relate more especially to the geology of the British Isles. This group is considered in detail, and constitutes the bulk of the address. In the second group are placed numerous papers which may roughly be classified under the following headings:—Miscellaneous geology, foreign and colonial—a somewhat exhaustive division, comprising about a score of papers, dealing with many subjects in different parts of the world. African geology, especially, comes to the front in this group. Miscellaneous invertebrate palæontology—a score of papers may be thus classified. Most of these matters are for the consideration of specialists, relating to corals, crinoidea, bryozoa, ostracoda, cephalopoda, and to siliceous organisms. In palæobotany there has only been one paper of any importance; whilst under the heading dynamical problems are a few papers dealing with the movement of material. A notice of the Inverness earthquake, and a communication on the origin of the basins of the great lakes of America, complete this category. The detailed consideration of the first group commences with the newer palæozoic rocks. The carboniferous system has not yielded any important stratigraphical papers of late years, but there have been some interesting communications respecting the coal measures. Questions as to the origin and faunal character of these are discussed by more than one writer, and very important deductions, as to the delimitation of the marine and freshwater beds, have been drawn. The subject of coal in the south-east of England was considered, *à propos* of a paper read at the Society some years ago, and the prospects of coal-getting at Dover and elsewhere in this part of England discussed. In Devonian geology, the structure and peculiarities of the South Devon limestones form the subject of an interesting communication; and there are also important stratigraphical papers in this connection, more especially one written subsequent to the visit of a party from the International Geological Congress of London. In the older palæozoic rocks a considerable amount of work has been done, more especially amongst the Silurian and Ordovician of the north-west of England, where additional evidence has been furnished of the value of graptolite-zones as a means of comparison with the older palæozoics of distant areas; and a further contribution has also been made to our knowledge of beds of this age in the Cross-Fell inlier. The papers dealing with the fossiliferous Cambrian are not numerous, but they are of great importance, including the recognition of a very low Cambrian fauna at the top of the Penrhyn quarries, and Sir J. W. Dawson's correlation of American with European Cambrians. The discovery of *Olenellus* in the "fucoid beds" of the north-west Highlands also serves to fix the Cambrian age of the Durness limestone, to which formation the altered limestone of Strath in Skye, at one time regarded as of Liassic age, is now held to belong. The physical relations and the post-Cambrian metamorphism of the rocks of the north-west Highlands are also considered under this heading. The fundamental rocks are roughly divided into three categories, viz. the sedimentary series, the volcanics, and the crystalline schists. The first includes the Torridon sandstone, the Longmynd rocks, the unfossiliferous Cambrians of Wales, &c. The volcanic series has already formed part of the subject of an address from the chair. Oddly enough, the best defined pre-Cambrian, or fundamental sedimentary series, is to be found in the north-west Highlands, a district which only a few years ago was an enigma, but which we hope may now supply a clue to regions more obscure. This, of course, is the Torridon sandstone, which has a well-defined base and a well-defined summit. Then there are certain rocks which some regard as Cambrian, others as pre-Cambrian, such as the Howth Hill and Bray Head beds, claimed as Upper Monian. Crossing St. George's Channel, we find ourselves in Anglesey, a land of pre-Cambrian mysteries. The older rocks have been described as belonging to the Monian system, an arrangement much controverted, and this controversy has extended to Shropshire. Lastly, there is the long-standing contention as to whether the unfossiliferous Cambrians of North Wales really belong to that system or should be placed on a lower horizon. The Malvernian controversy relates, in the main, to the crystalline schists. Under the heading of General Petrology is grouped a very large series of papers, more than sixty in number, divided roughly into two primary classes, according as they relate to the British Isles or to foreign countries, the former class being alone considered in detail. The arrangement is topographical, and the rocks under this heading may be of any age from the Archæan upwards. Scotland has yielded seven papers in this group—most of them of very great interest and importance, one or two being somewhat controversial. The subject of contact-metamorphism is raised with reference to more than one Scotch locality; and from the Lake District there has been a communication on the Shap granite and associated igneous and metamorphic rock, which again brings this question into prominence. Some of the papers relating to Wales have already been dealt with in a previous address, but the subjects of the variolite and also of the nodular felstones of the Lleyn are noticed on the present occasion. In Devonshire the rocks formerly known as "felspathic traps" have been described as basalts and andesites; whilst the igneous origin of the Dartmoor granite has been maintained against one of those theories which from time to time crop up with respect to this well-known *massif*. Allusion is also made to the controversy with respect to the Start rocks. There have been four papers dealing with the Lizard peninsula, in which questions as to priority of the several igneous masses and as to the origin of the banded gneisses are entertained. It cannot be doubted that considerable progress has been made of late towards a recognition of the true character of these rocks, which, for the extent of territory they occupy, are perhaps without equal in point of interest throughout the British Isles. The

address concludes with a notice of the rocks of Brittany and the Channel Isles, which have attracted the attention of more than one author.

CAMBRIDGE.

Philosophical Society, February 26.—Prof. Hughes, President, in the chair.—The following communications were made:—On current-sheets, specially on ellipsoids and anchor-rings, by Mr. R. H. D. Mayall. The electric currents induced in thin uniformly conducting sheets of any shape placed in a variable magnetic field were considered; and it was shown that they could be determined by the solution of a differential equation of the second order with the aid of the appropriate boundary conditions. Orthogonal curvilinear co-ordinates were used in every case, the equation to the surface of the conductor being got by making one co-ordinate constant. In this way results were worked out for the infinite plane, the sphere, the infinite right circular cylinder, and the ellipsoid with three unequal axes. The case of the anchor-ring was also discussed, and a set of linear equations found to determine the unknown coefficients in the expression for the current function. These were solved for the particular case when the exciting disturbance was represented by a harmonic of the first degree and symmetrical about the axis of the ring; and a simple expression was found for the modulus of decay of free currents of the same type.—The complete system of quaternariants for any degree, by Mr. D. B. Mair. A method is given for finding the concomitants of a quaternary form of any degree or of simultaneous quaternary forms. The cases of a single quadratic, a single cubic, a single quartic, a system af two quadratics, and a system of three quadratics, are treated at length.—The configuration of a pair of equal and opposite hollow straight vortices, of finite cross-section, moving steadily through a fluid, by Mr. H. C. Pocklington.—On a class of definite integrals connected with Bessel's functions, by Mr. A. B. Basset.

PARIS.

Academy of Sciences, February 26.—M. Lœwy in the chair.—On the scientific work of Jean Louis Armand de Quatrefages de Bréau, by M. Edmond Perrier.—On the equation of the vibrations of a membrane, by M. H. Poincaré.—On a way of obtaining a uniform circular movement by means of two vibratory movements, by M. Marcel Deprez.—Observations of the new planet AV (Courty, 1894, February 11), made at the Paris Observatory, by MM. O. Callandreau and G. Bigourdan.—On the application of the method of successive approximations to the ordinary differential equations of the first order, by M. Ernest Lindelöf.—Observations on the preceding communication, by M. Émile Picard.—The combustion of the ordinary ballistic explosives, by M. P. Vieille. The old black and brown powders do not show combustion by parallel surfaces, whereas the new colloidal powders give data satisfying exactly the criterion of combustion by parallel surfaces.—On the fundamental laws of heat, by M. G. Mouret. The three laws concerning,—the conservation of entropy in reversible operations, the conservation of heat in conduction, and the increase of entropy in irreversible operations, appear to be fundamental laws of heat, and not derivable from a more general law.—On a means of compensating the E.M.F. of a hydro-electric pile, by M. J. Schürr.—Measurement of the difference of phase between two alternating sinusoidal currents of the same period, by M. Albert Hess.—Action of heat on the double nitrites of metals of the alkali group and metals of the platinum group: ruthenium compounds, by MM. A. Joly and E. Leidié. The formulæ $Ru_2(NO_2)_6.4KNO_2$ and $Ru_2O(NO_2)_4.8KNO_2$ are now assigned to the potassium ruthenium nitrites. At 360°-440° in a vacuum, explosive decomposition occurs of the latter compound, with the production of nitrogen, nitrogen dioxide, potassium nitrite, and an insoluble black substance, $3Ru_2O_5.K_2O$. The preparation and properties of the sodium compounds, $Ru_2(NO_2)_6.4NaNO_2+4H_2O$ and $Ru.NO.Cl_3.2NaCl$ are described. The former yields the compound $Na_2O.3Ru_4O_9$ on heating in sulphur or mercury vapours; at a red heat RuO_2 is produced.—On the isomerism of the nitrobenzoic acids, by M. Œchsner de Coninck. A study of the relative solubilities of the ortho-, meta-, and para-nitrobenzoic acids in distilled water, dilute alcohol, ether, benzene, light petroleum, carbon bisulphide, and chloroform is given.—On some derivatives of the oxazine and eurhodine series, by M. Charles Lauth.—Analysis of a damaged cheese; extraction of a new ptomaine, by M. Charles Lepierre. A well-crystallised base of the formula $C_{16}H_{24}N_2O_4$ has been isolated. It is bitter, inodorous, slightly acid to phthaleïn, soluble in alcohol but hardly soluble in water, and gives the usual alkaloid reactions but does not yield a tannin precipitate. Its specific rotatory power $[\alpha]_D = +11{\cdot}3°$ in water. It causes diarrhœa.—On some laboratory apparatus, by M. André Bidet.—On the odour of benzoic acid (remarks on inodorous substances), by M. Jacques Passy.—Anatomy of the salivary glands of the *Philantidæ*, by M. Bordas.—On the internal characteristics of the grape, and their utilisation in the determination of species and the distinction of hybrids, by M. Gustave Chauveaud.—Artificial reproduction of *avens*, by M. Stanislas Meunier.—The five days' hurricane, from February 8 to 12, 1894, in Bohemia. A letter from M. Ch. V. Zenger to M. A. Cornu.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Thermodynamics of Reversible Cycles in Gases and Saturated Vapours: Dr. M. I. Pupin (K. Paul).—The Badminton Library—Big Game Shooting, 2 vols.: C. Phillipps-Wolley, &c. (Longmans).—Philip's Systematic Atlas: E. G. Ravenstein (Philip).—Nature Pictures for Little People: M. Mawer, &c. (Sunday School Association).—Le Climat de la Belgique en 1893: A. Lancaster (Bruxelles, Hayez).—Man the Primeval Savage: W. G. Smith (Stanford).—Report on North-Western Manitoba: J. B. Tyrrell (Ottawa, Dawson).—Ergebnisse der Meteorologischen Beobachtungen Jahrg. xv. (Hamburg).—A Treatise on Elementary Hydrostatics: J. Greaves (Cambridge University Press).—Joh. Müller's Lehrbuch der Kosmischen Physik and Atlas to ditto.—Fünfte umgearbeitete und Vermehrte Auflage: Dr. C. F. W. Peters (Braunschweig, Viewig).—Analytical Geometry for Beginners: Rev. T. G. Vyvyan, Part 1 (Bell).—Introduction to Elementary Practical Biology: C. W. Dodge (New York, Harper).—Aero-Therapeutics: Dr. C. T. Williams (Macmillan).—Lehrbuch der Petrographie: Dr. F. Zirkel, Zweiter Band (Leipzig, Engelmann).

PAMPHLETS.—The Texan Monsoons: M. W. Harrington (Washington).—Die Tropischen Orkane der Südsee, &c.: E. Knipping (Hamburg).—The Function of Museums, as considered by Mr. Ruskin: W. White.—Meteorology at the Paris Exposition: A. L. Rotch.

SERIALS.—Geological Magazine, March (K. Paul).—Records of the Botanical Survey of India, Vol. i. Nos. 1 and 2 (Calcutta).—American Naturalist, February (Philadelphia).—Botanical Gazette, February (Madison, Wis.)—Geological Journal, March (Stanford).—Observaciones Magnéticas y Meteorologicas del Real Colegio de Belen, Julio-Dic. 1889 (Habana).—Bulletin of the New York Mathematical Society, Vol. 3, No. 5 New York, Macmillan).—Science Progress, No. 1 (Scientific Press).—Quarterly Journal of Microscopical Science, March (Churchill).

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