

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. Wiedeberg. 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 Kettenbruchentwicklung 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 Mathématiques*, 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 *Calamites*, 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 *Astronyelon*.

(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 heterospority 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.