

nected with the positive or with the negative terminal of a little Voss electric machine, its fumes (products of combustion mixed with air) sent through a block-tin pipe, four metres long, and one centimetre bore, ending with a short insulating tunnel of paraffin and the electric filter, gives strong positive or strong negative electricity to the filter.

§ 18. Using the little biscuit-canister and electrified needle, as described in "our communication" * to the Royal Society "On the Diselectrification of Air," but altered to have two insulated needles with varied distances of from half a centimetre to two or three centimetres between them, we find that when the two needles are kept at equal differences of potential positive and negative, from the enclosing metal canister, little or no electrification is shown by the electric filter; and when the differences of potential from the surrounding metal are unequal, electrification, of the same sign as that of the needle whose difference of potential is the greater, is found on the filter.

When a ball and needle-point are used, the effect found depends chiefly on the difference of potentials between the needle-point and the surrounding canister, and is comparatively little affected by opposite electrification of the ball. When two balls are used, and sparks in abundance pass between them, but little electricity is deposited by the sparks in the air, even when one of the balls is kept at the same potential as the surrounding metal. [The communication was illustrated by a repetition of some of the experiments shown on the occasion of a Friday evening lecture † on Atmospheric Electricity at the Royal Institution on May 18, 1860, in which one half of the air of the lecture-room was electrified positively, and the other half negatively, by two insulated spirit lamps mounted on the positive and negative conductors of an electric machine.]

(2) "ON THE THERMAL CONDUCTIVITY OF ROCK AT DIFFERENT TEMPERATURES."

Experiments by Lord Kelvin and Mr. Erskine Murray were described, and the apparatus used in them was shown, by which it was found that the thermal conductivity of specimens of slate, sandstone, and granite is less at higher temperatures than at lower for each of these rocks. The last tested was Aberdeen granite, for which experiments of fairly satisfactory accuracy showed the mean conductivity for the range from 146° C. to 215° C. to be 86 per cent. of the mean conductivity in the range from 81° C. to 146° C. They hope to send a communication to the Royal Society describing their work before the end of the present session.

KELVIN.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Mr. D. R. Pike, of the Charterhouse, has been elected to an open Exhibition in Natural Science at Jesus College, and Mr. L. C. W. Brigstocke, of Haverfordwest Grammar School, has been elected to a Welsh Foundation Scholarship in Natural Science at the same College.

Open Scholarships and Exhibitions in Natural Science have been announced for competition at Merton College, New College, Magdalen College, and Corpus Christi College. Particulars may be obtained on application to the Dean in any of these Colleges.

CAMBRIDGE.—The Walsingham Medal for an original monograph on a botanical, geological, zoological, or physiological subject will be awarded in the Michaelmas Term. Essays are to be sent to Prof. Newton by October 10, 1895. Candidates must be B.A.'s not of standing to take the M.A. degree.

The subject for the Adams Prize of 1897 is connected with Bessel's Functions. It is set forth in the *University Reporter* for May 14. The prize is of the value of about £197. It is open to all graduates of the University. Essays are to be sent to the Vice-Chancellor by December 16, 1896.

THE Association of Technical Institutions has endeavoured to induce the Science and Art Department to discontinue the examinations now held in practical inorganic and organic chemistry, and to award attendance grants for instruction in those subjects, the amount of such grants to be dependent upon the report of the Department's inspectors on the efficiency of the equipment and teaching. The Association has received a reply to the effect

* *Proceedings of the Royal Society*, March 14, 1895.
† "Electrostatics and Magnetism," xvi, §§ 285, 286.

that it is not possible for the Department to comply with their request. A new syllabus for practical inorganic chemistry will appear, however, in the forthcoming edition of the Science and Art Directory, and there seems little doubt that the instruction will be so arranged in it as to make it possible to coordinate more closely the laboratory and lecture work in that subject, and afford the same latitude to teachers as is given by the new Regulations for Organised Science Schools.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xvii. No. 2 (Baltimore, April 1895).—A method for calculating simultaneously all the roots of an equation, is a paper by Dr. E. McClintock, which was read before the American Mathematical Society on August 14 and October 27, 1894. It opens with the application to an example employed by Spitzer and by Jelinek. The calculations of these mathematicians can only be done for a pair of roots at a time, and that with considerable difficulty. The method employed by our author is fairly facile. Very little has hitherto been done in the direction of this memoir, which is one of great value in the subject of algebraic equations. The writer discusses eleven examples at length, the highest degreed equation being one of the sixth degree in x .—Sur le logarithme de la fonction gamma, by Hermite, is a note upon Raabe's integral, in continuation of an article in the *Math. Annalen* (41, p. 581).—Sur la pression dans les milieux diélectriques ou magnétiques, by Prof. P. Duhem, corrects an error in his "Leçons sur l'Électricité et le magnétisme," and is a valuable working out of the theory of the pressures, initiated by Clerk Maxwell, and further improved by von Helmholtz, Kirchhoff, and other writers. The number closes with an article on ternary substitution-groups of finite order which leave a triangle unchanged, by H. Maschke. This paper is complementary to C. Jordan's "Sur les équations, différentielles linéaires à intégrale algébrique," and "Sur la détermination des groupes d'ordre fini contenues dans le groupe linéaire."

Zeitschrift für wissenschaftliche Zoologie, Bd. lix. Heft 1.—Prof. A. R. von Heider gives a detailed description of a new Actinian (*Zoanthus hierchia*) obtained during the cruise of the *Vettor Pisani*. Prof. A. Korotneff describes the embryonic development of *Salpa democratica*. According to him the follicle-cells do not play the important part in the development of *Salpa* which Salensky attributed to them, nor do they form a temporary scaffolding for the blastomeres, as stated by Brooks. The embryo is built up of blastomeres in the normal manner, and embryonic layers are present with the same significance as in other groups. The cloaca is formed by the union of endodermal diverticula, and the pericardium develops as an outgrowth of the pharynx.—Prof. W. Schimkewitsch writes upon the structure and development of a species of *Dinophilus* living in the White Sea, near the Solovetzki laboratory. The twofold affinities of this interesting type, on the one hand with the Annelids, and on the other with the Rotifers, are succinctly stated.—Prof. Vejvodsky writes upon the sexual apparatus of *Lumbriculus variegatus*.—Dr. Montgomery deals fully with the anatomy of a new type of Nemertine (*Stichostemma Eilhardi*) discovered in fresh-water aquaria in the Berlin Zoological Institute.—Dr. McKim describes the nephridial funnel apparatus of *Hirudo*.

SOCIETIES AND ACADEMIES.

EDINBURGH.

Royal Society, March 18.—The Rev. Prof. Flint, Vice-President, in the chair.—Prof. Crum-Brown communicated a paper, by Mr. R. Fairbairn and himself, on the action of sodium mercaptide on dibromomalonate ether.—Prof. J. C. Ewart communicated a paper, by Mr. F. J. Cole and himself on the dorsal branches of the cranial and spinal nerves in elasmobranchs.—Dr. Traquair read a paper on phosphorescent sandstones.—Prof. Tait read a note on the electromagnetic wave-surface.

April 1.—Sir Douglas Maclagan, President in the chair.—A paper, by the Duke of Argyll, on the glaciation of two glens, was read. The glens are Glenaray and Glenshira. The usual explanation of the phenomena of glaciation as observed in the West Highlands is that the glaciation was caused by an enormous ice-cap covering the whole country. His Grace does not consider that the phenomena can be so explained. Rocks are found which are striated and smoothed on one side, while the other side remains rough. Isolated blocks, without striation,