SCIENTIFIC SERIALS.

Wiedemann's Annalen der Physik und Chemie, No. 6.—Diffusion constants of some metals in mercury, by G. Meyer. A dilute zinc amalgam was poured into two glass tubes, one of which was closed by fusion at the bottom, while the other was provided with a fine net of platinum wire, which did not allow the amalgam to penetrate. The latter tube was inserted in a beaker containing H_2SO_4. The two tubes were joined by a siphon. On passing a current through, with a kathode of platinum immersed in the beaker, the lowest layer of amalgam next the net was deprived of zinc and reduced to the state of pure mercury. The concentration of the top layer was estimated by the E.M.F. between the two tubes, and the rate of fall of the concentration was used to determine the diffusion constant of the zinc in the mercury. It was found to be 0·087 in cm.-hours for zinc, 0·065 for cadmium, and 0·057 for lead.—Electric vibrations in the Lecher system, by R. Apt. The author investigates the influence of the primary exciter in a Lecher wire system upon the form and intensity of the oscillations. There are nodes at the bridges over the secondary wires and at the spark gap. A maximum of intensity is obtained when the divisions of the secondary circuit are in resonance amongst themselves, and with the two divisions into which the primary system is divided by the spark gap. If the spark passes in a gas, the intensity varies directly with the pressure.—Kathode and Röntgen rays, by J. Precht. Goldstein's "canal rays," produced by perforating the kathode, are kathode rays which are not deflected by the magnet. They are distinguished from Röntgen rays by the absence of photographic and fluorescent actions. Röntgen rays have a condensing effect upon water vapour, and they increase the resistance of a selenium cell by 32 per cent. A portion of the rays proceeding from discharge tubes is not a wave motion, since the extent of absorption of the Röntgen rays by paper depends upon the duration of the radiation. Perhaps this part of the action is of a purely electrical nature. Röntgen rays show distinct interference phenomena, and are therefore partly due to some kind of wave motion.—Measurements of the interference of direct X-rays and others reflected at grazing incidence gave wave-lengths of 370 to 830 $\mu\mu$. These are near the limits of the visible spectrum, and since these rays are practically invisible they are probably longitudinal for the most part.—Arc lamps with amalgam terminals, by E. Gumlich. Arons has constructed an arc lamp in which the electrodes consist of mercury. If amalgams could be used instead, they might be made to yield an intense spectrum due to the body combined with the mercury. The author took special precautions to avoid oxidation during the filling process, and constructed a successful cadmium amalgam lamp which gives a brilliant red line. To avoid loss of light due to the opaque deposit round the kathode, the electrodes are placed in side tubes, and the light is projected down the main tube by a mirror.

No. 7.—Damping effect of a magnetic field on rotating insulators, by W. Duane and W. Stewart. The phenomena of damping of such bodies as sulphur and paraffin when rotating in a magnetic field, described some time ago by Duane, are, after all, found to be due to traces of iron. This can only be proved, however, by distilling these bodies five times and noting the absence of the damping. The latter will persist even after all chemical reactions have failed to indicate the presence of iron. The damping test is fifty times more delicate than chemical analysis.—Conductivity of carbon for heat and electricity, by L. Cellier. In metals the electric and thermal conductivities have an approximately constant ratio, if the specific heat per unit volume is taken into account. Measurements made with graphite, retort carbon, and various kinds of arc light carbons show that there is no correspondingly simple relation in the case of carbon. Whilst in the case of metals the ratio between the two conductivities varies between $0{\cdot}07 \times 10^6$ and $0{\cdot}12 \times 10^6$, it varies between the limits $1{\cdot}8 \times 10^6$ and $53{\cdot}72 \times 10^6$ in the carbons studied. The relation referred to seems, therefore, only to hold good for metals.—Magnetic deflection of kathode rays and its dependence upon the discharge potential, by W. Kaufmann. The extent to which kathode rays are deflected by a magnetic field is usually considered to depend upon the gas, the degree of exhaustion, and the dimensions of the tube. The author claims to have shown that all these conditions are only of secondary importance, and owe their influence exclusively to the fact that they affect the discharge potential between the anode and the kathode. The magnetic deflectibility is inversely proportional to the square root of the difference of potentials.—Determination of the period of electric oscillations, by Margaret E. Maltby. This paper contains the description of a new method for determining the ratio v between the electrostatic and electromagnetic units. It is based upon the principle of the Wheatstone bridge. The capacities of the two halves of an electrometer form two branches, and a known capacity and a known resistance form the third and fourth branches respectively. The mean value of three series of measurements was $3{\cdot}015 \times 10^{10}$, which differs from the best results extant by an amount well within the errors of observation.—A relation between the electrical, chemical, and geometrical properties of a crystal, by J. Beckenkamp. The genesis of the electrical poles is connected with the chemical structure of a crystal. This is evidenced by such facts as that in aragonite treated with HCl, and in baryta treated with H_2SO_4, the directions of greater solubility are opposed to the positive direction of the electrical lines of force.

SOCIETIES AND ACADEMIES.

EDINBURGH.

Royal Society, July 19.—Lord Kelvin in the chair.—The President presented to the successful Fellows the prizes awarded by the Council, and in a few words described the nature and value of the work done by each.—Mr. J. W. Inglis read an interesting popular account of his experience of Indian earthquakes during a residence in that country of nearly twenty-five years.—Dr. C. G. Knott read a paper on relations among various types of magnetic strains. The first note dealt with the relation between the elongation in iron or nickel in a magnetic field, and the twist produced in the same, when, in addition, an electric current was passed through the material in the direction of the magnetisation. Data recently obtained were used in testing a formula, given by the author in a previous paper (*Trans.* R.S.E., vol. xxxv., 1888), for the twist in a cylinder under longitudinal and circular magnetising process. The striking characteristics of the twist phenomenon were reproduced, *e.g.* the maximum twist in iron occurring in a field lower than the field for maximum elongation, and the maximum twist in nickel, although in this metal there is no maximum or minimum point in the elongation-curve. The second note gave an account of experiments elucidating the character of the strain in a nickel tube when magnetised. There was a small but measurable diminution of volume produced in the material of the tube, and a (comparatively) large apparent diminution of volume indicated in the outer dimensions of the tube, when it was plugged up at both ends. The elongation in the direction of magnetisation having also been measured, the data were used to calculate the radial displacements, usually outwards, of the inner and outer surfaces of the tube. In a tube of external radius 1·39 c.m. and internal radius ·477 c.m. these displacements, in a field of 200, of the corresponding surfaces were 9·6 and 1·9, and in a field of 500, 14·7 and 2·3, the unit being 10^{-6} c.m. The probable nature of the strain at different parts was considered.—A very interesting paper, giving an account of the expedition from Edinburgh to observe the total eclipse of the sun on August 8, 1896, was read by Prof. Copeland and Mr. Ramsay.—The President then adjourned the meeting till November.

DUBLIN.

Royal Dublin Society, June 16.—Prof. W. J. Sollas, F.R.S., in the chair.—Mr. J. R. Wigham described a new method of conferring distinguishing characteristics upon illuminating buoys and beacons for harbours, estuaries, and rivers.—Mr. Richard J. Moss read a paper on the cause of the death of fish in the Flesk River and Killarney Lake during the recent bog-flow in the County of Kerry.—Mr. William Barlow read a paper on a mechanical cause of homegeneity of structure and symmetry geometrically investigated, with special application to crystals and to chemical combination. This paper was communicated by Prof. W. J. Sollas, F.R.S.—Prof. D. J. Cunningham, F.R.S., gave a lantern demonstration of the deep origins of certain of the cranial nerves in the chimpanzee and orang-utan.—The following paper was omitted from the list of those read at the meeting of May 19: A spectrographic analysis of iron meteorites, siderolites, and meteoric stones, by Prof. W. Noel Hartley, F.R.S., and Mr. Hugh Ramage.

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