



On the experiments made at the instance of the electro-technical union on thunder-storms and protection against lightning

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cobalt with a bismuth plate by simultaneously heating them on one side, and cooling on the other while separated from each other by a plate of mica, and placed in the magnetic field. The ratio of the thermomagnetic effects referred to Bi=100, were for Sb=5.5, for Ni 4.8, and for Co=0.5.

In how far the observed currents can be brought in connexion with Hall's phenomenon must for the present be left undecided. We may be allowed to mention that Sb, Co, Fe, and steel have a positive rotatory power, Bi, and Ni, on the contrary, a negative one, which is in agreement with our own measurements of the Hall's phenomenon in the plates in question, although our numbers differ greatly from those of Hall.

If the bismuth plate previously mentioned was traversed by a galvanic current, then in order to produce in the same magnetic field a Hall's electromotive power of the same strength as the thermomagnetic which we observed, it must have an intensity of 15 amperes, assuming the same intensity in all parts of the plate.

This phenomenon appears in any case to be ultimately related to the molecular structure of the metals.—Wiedemann's *Annalen*, No. 10, 1896.

ON THE EXPERIMENTS MADE AT THE INSTANCE OF THE ELECTRO-TECHNICAL UNION ON THUNDER-STORMS AND PROTECTION AGAINST LIGHTNING. BY L. WEBER.

In order to investigate the influence of the efficiency of lightning-conductors, the author arranged two lightning-conductors, about 6 metres high, which carried the various points, about 5 metres from each other, and introduced a galvanometer into the earth-contact. Experiments made with this arrangement in various places in the Riesengebirge, as well as in Breslau and the neighbourhood, showed the applicability of the method. Observations were also made on the increase of potential with the height. A kite, the conducting-cord of which was connected with a galvanometer, was allowed to rise to various heights near a detached house in the vicinity of Breslau, and the following results were obtained:—

Height, in metres	45	71	107	140	115	78	41	139
Strength of current	29	61	451	1078	627	257	40	1332

The unit of current is 10^{-9} amperes. At the beginning of the observations the sky was covered with light cirrostratus clouds; towards the end it cleared up. The observations agree with those of Exner, found by electroscopic means (*Beiblätter*, vol. xi. p. 292). Some experiments were also made during the passage of clouds, which sometimes showed their negative electricity. In thunderstorms the galvanometer shows a momentary agitation, which corresponds to a return shock in the lightning-conductor. The needle

then begins to be deflected in the opposite direction with a gradually increasing strength, until after a fresh flash a throw in the opposite direction is observed. The intensity of the deflection increases with the proximity of the lightning-flashes.—*Beiblätter der Physik*, vol. xi. p. 376; *Electrotechnische Zeitschrift*, vol. vii. p. 445.

ON THE MELTING-POINT OF ICE AT PRESSURES UNDER ONE ATMOSPHERE. BY B. J. GOOSENS.

The author finds that when the pressure is reduced from 760 to 5 millim. the melting-point of ice is raised 0.0066° . The determinations were made as follows:—

A glass tube was closed at the bottom by a cork, through which thermoelements were inserted, so that one set of solderings was inside and the other outside the tube. After the tube had been filled with water, and placed in a vessel which also contained distilled water, the upper end of the tube was connected with the air-pump. The water in both vessels was then frozen, and as the ice again began to melt, the whole apparatus was brought into a large vessel containing lumps of ice. The ice in the interior kept for several days. If some in the inner was melted all could be frozen by lowering the pressure. A galvanometer was connected with the thermoelements, and readings were made, firstly, when there was the same pressure in both vessels; and, secondly, after the pressure in the inner vessel was lowered to 5 millim.; and after waiting until the temperatures were constant.—*Arch. Neerland*, xx. p. 449. *Beiblätter der Physik*, No. 7, 1877.

ON THE THOMSON EFFECT. BY A. BATELLI.

The experiments were made with cadmium, which is relatively homogeneous and shows the phenomenon in particular strength. Two perfectly equal rods of pure cadmium 36 centim. in length, and 5 millim. in thickness, were covered in the middle and at each end for a length of 5 millim. with copal varnish, which resists temperatures over 200° , and does not transmit mercury, and were wound with a very thin silk ribbon. The two bars passed through two perfectly similar boxes of sheet-iron filled with equal quantities of mercury, in which were immersed the middles of the rods. Where each end projected from the box thermoelements of thin iron and argentan wires were fastened to the rods. The varnished ends of the rods were in melting ice, and the unvarnished in a steam bath, and were connected there by a thick copper wire. The cold ends were connected with the poles of a battery of 2 Bunsen's elements. In the mercury in the two iron boxes (which was kept in motion by a stirrer) dipped the two varnished junctions of a thermopile of two iron-argentan elements connected