

The object of the observations was to obtain data for August 21, the date of a solar eclipse, which was total at Theodosia, and for comparison data from some adjacent days. The records were derived with the aid of a magnetograph of the Mascart type, which is fully described and illustrated by photographs. The curves were read at five-minute intervals for some hours during the time of the eclipse, and the tabulated results for declination, horizontal force, and vertical force are compared with the corresponding mean results from the adjacent days. The data are exhibited graphically in curves, with corresponding data from De Bilt (Netherlands), Rude Skov (Denmark), Seddin (Germany), and Ekaterinburg (Russia). In the case of horizontal and vertical force, it is shown that some movements, which might not unnaturally be associated with the eclipse if the Central European records only had been available, must be assigned to some other cause, but Prof. Palazzo is disposed to associate some of the declination phenomena with the eclipse. There are a good many references to earlier work on the subject.

PROF. A. RIGHI has published a second memoir (*R. Accademia delle Scienze dell' Istituto di Bologna*, November 25, 1917) dealing with the ionisation produced by X-rays in a magnetic field. In the first part of the paper Prof. Righi discusses the question raised in these columns (*NATURE*, vol. c., p. 32, p. 224, 1917) of the possibility of explaining the experimental results as to the increase of current by taking into account the oblique, and therefore longer, paths of the ions under the joint actions of the two fields. He points out that the kinetic energy of an electron (or of an ion) depends only on the electric field and on the projection of the path on the direction of the said field, and is not affected by the existence of the magnetic field. Prof. Righi's own view of magneto-ionisation is that an electron in motion can ionise a gaseous atom by collision, when this is in a magnetic field, even if the kinetic energy of the electron does not reach that minimum which is necessary when the field does not exist. On this theory it is possible to explain not only the increase in current due to the magnetic field, but also the fact that when the field is made sufficiently strong there is an inversion of the observed effect, the current diminishing instead of increasing. There are two causes at work, producing opposite effects: magneto-ionisation and the magnetic deviation or change in the paths of the particles. The former increases with the magnetic field, but reaches a limiting value; the latter increases indefinitely, and finally gets the upper hand. The paper contains an analytical discussion of the motion of an electron in a uniform electric field on which is superposed a perpendicular magnetic field, a problem previously considered by Sir J. J. Thomson ("Conduction of Electricity through Gases") and treated elegantly by a purely geometrical method by W. B. Morton (*Phys. Soc. Proc.*, vol. xxi., p. 309, 1909). The last part of the paper gives an interesting account of new experiments carried out with an apparatus specially designed to test the existence of magneto-ionisation. Curves are given showing the relation between the current and the applied potential difference for various magnetic fields. These indicate an increase in the current when a magnetic field is applied, the increase being most marked when the potential difference exceeds a certain value depending on the strength of the magnetic field.

THE so-called "iminohydrins," or isoamides, were first prepared by Eschweiler in 1897, who gave them the general formula  $R.C(OH):NH$ . They were afterwards (1901) investigated by Hantzsch, and given the dimolecular formula  $NH:CR.O.NH_2:CR.OH$ . Dr.

H. G. Rule has studied these compounds afresh, and gives an account of his results in the January issue of the *Journal of the Chemical Society*. He shows that they are amidine salts of the general type  $R.C(NH_2):NH,R.CO_2H$ , and that "glycollimino-hydrin," the first of Eschweiler's preparations, is really glycollamidine glycollate,



The constitution of this and similar compounds is proved by its synthesis by the interaction of sodium glycollate and glycollamidine hydrochloride, this method of preparation giving a far better yield than Eschweiler's method of treating the imino-ether hydrochlorides with moist silver oxide. Besides the glycol compound methoxyacetamidine methoxyacetate, acetamidine acetate and phenylacetamidine phenylacetate were prepared, whilst mandelamidine mandelate was obtained by Dr. J. E. Mackenzie. Molecular weight determinations, by the cryoscopic method, of these compounds support the new theory of their constitution, on the assumption that they are almost completely ionised in solution. To explain the formation of these amidine salts by the action of water on the imino-ethers, Dr. Rule suggests that the latter first undergo autohydrolysis, forming ammonium salts of the corresponding acids, and that these then interact with the imino-ethers.

IN a paper on the possibilities of the ferro-concrete ship read by Major Maurice Denny at the Institution of Naval Architects on March 22, the author raises the interesting point of the permissible stress on the steel reinforcement under tension, without the risk of rupture occurring in the adjacent concrete. A usual figure taken in land structures is 16,000 lb. per sq. in. for the working tensile stress in the steel; with a modular ratio of 12.5 this would produce a tensile stress of about 1300 lb. per sq. in. in the neighbouring concrete—i.e. a stress sufficient to produce rupture of some sort. The matter is of serious importance in ship construction, owing to the necessity for maintaining watertightness. In the discussion on this paper—reported in *Engineering* for April 5—Mr. J. Foster King provided a long and valuable contribution in the course of which reference was made to the same matter. Taking the elastic modulus of reinforced concrete to be the same as that of plain concrete—8 per cent. of that of steel—the permissible stress on the steel must not exceed 5400 lb. per sq. in. if the concrete is to remain unbroken. As reinforced concrete lost homogeneity under tensile stresses which exceed the breaking stress of the concrete by 45 per cent., the designed working stress on the concrete should be less than its own tensile strength, so as to leave such a margin between ordinary and extraordinary stresses as experience had forced upon shipbuilders. Experience of reinforced concrete had been derived from ratios of steel to concrete of about 1 per cent., and it seemed unreasonable to expect effective bond of steel and concrete when the ratio exceeds 8 per cent. Mr. King suggests experiments upon material exposed concurrently to tension and water pressure, in order to ascertain the point where steel and concrete cease to lend their properties to one another.

ERRATUM.—A correspondent points out that it was Pope Innocent VIII. who, in 1484, gave the sanction of the Church to the popular beliefs concerning witches referred to in *NATURE* of April 4 (p. 82), and not Pope Innocent VII., as there stated. The reference in Dr. Withington's article was correct, but was wrongly given by the reviewer.