

2. *Zinc and Platinum with Hydrochloric Acid.*—With the astatic galvanometer, between 1 in 9,300,000 and 9,388,185 parts; and with the reflecting one, between 1 in 15,500,000 and 23,250,000 parts.

3. *Magnesium and Platinum with Bromine.*—With the astatic galvanometer, between 1 in 310,000,000 and 344,444,444 parts.

4. *Zinc and Platinum with Chlorine.*—With the astatic galvanometer, between 1 in 1,264,000,000 and 1,300,000,000 parts.

5. *Magnesium and Platinum with Chlorine.*—With the astatic galvanometer, between 1 in 17,000,000,000 and 17,612,000,000 parts; and with the reflecting one, between 1 in 27,062,000,000 and 32,291,000,000 parts of water.

Every different soluble substance requires a different proportion, and with unlike substances the difference of proportion is extremely great. With solutions of neutral salts, the proportion of substance required to upset the balance is large; for instance, with chlorate of potash, a zinc-platinum couple, and the astatic galvanometer, it lay between 1 part in 221 and 258 parts of water.

The degree of sensitiveness of the balance is usually greater, the greater the degree of chemical affinity the dissolved substance has for the positive metal and the less it has for the negative one.

By first bringing the balance with a magnesium-platinum couple and the astatic galvanometer nearly to the upsetting-point by adding 1 part of chlorine to 17,612,000,000 parts of water, and then increasing the proportion to 1 in 17,000,000,000, the influence of the difference, or of 1 part in 500,000,000,000, was distinctly detected.

“Magnetic Qualities of Nickel.” (Supplementary Paper.) By J. A. Ewing, F.R.S., Professor of Engineering in University College, Dundee.

The paper is a supplement to one with the same title by Prof. Ewing and Mr. G. C. Cowan, which was read at a recent meeting of the Society. It describes experiments, conducted under the author's direction by two of his students, Mr. W. Low and Mr. D. Low, on the effects of longitudinal compression on the magnetic permeability and retentiveness of nickel. The results are exhibited by means of curves, showing the relation which was determined between the intensity of magnetisation of the metal and the magnetising force, when a nickel bar, reduced to approximate endlessness by a massive iron yoke which formed a magnetic connexion between its ends, was magnetised under more or less stress of longitudinal compression. Corresponding curves show the relation of residual magnetism to magnetising force, for various amounts of stress; and others are drawn to show the relation of magnetic permeability to magnetic induction. Initial values of the permeability, under very feeble magnetising forces, were also determined. The experiments were concluded by an examination of the behaviour of nickel in magnetic fields of great strength. Magnetising forces ranging from 3000 to 13,000 C.G.S. units were applied by placing a short bobbin with a narrow neck made of nickel between the poles of a large electromagnet, and it was found that these produced a practical constant intensity of magnetisation which is to be accepted as the saturation value.

PARIS.

Astronomical Society, June 6.—M. Flammarion, President, in the chair.—Various drawings and observations were sent by MM. Petit, Rengel, and G. Vallet.—M. Flammarion read a paper on the solar eclipses of the 19th century, shewing strong discrepancies between M. Oppolzer's charts and the results of observation. Replying to M. Oppert, M. Flammarion said he should not advise historians to base their investigations on those charts.—M. M. Cornillon sent drawings of a large sunspot from May 11 to 23. M. Schmolli said that this spot was just on the limits of visibility to the naked eye from May 16 to 18.—M. Gaudibert sent a drawing of the lunar crater Flammarion. A fine rill traverses this crater, and extends to Réaumur after being interrupted by some hills.—M. Schmolli related an observation of the lunar crescent on May 12, the moon being 42½ hours old. Its breadth was from 30" to 35".—M. Trouvelot presented to the Society a series of celestial photographs offered by Prof. Pickering, of Harvard College. The photograph of the Pleiades is specially interesting, and shows the straight trails of nebulous matter which form such a striking feature in the last negatives obtained by MM. Henry.—Thanks were returned to Prof. Pickering, who was unanimously named honorary member of the

Society on the proposition of M. Trouvelot and Colonel Laussedat.—Colonel Laussedat explained his method of computing solar eclipses graphically, which is two or three times more rapid than the usual numerical calculation.

AMSTERDAM.

Royal Academy of Sciences, June 30.—M. Beyerinck stated the results he has obtained from experiments on hybridism or crossings with common barley (*Hordeum vulgare*, *H*) *hexastichon*, *H. distichon*, *H. Zeocriton*, and *H. trifurcatum*, made by him since 1884 on a large scale, and illustrated his subject with specimens, some dried and others preserved in spirits. He described the precautions to be taken in such crossing experiments, and deduced the following conclusions:—(1) All the above-mentioned sorts of barley may be crossed with facility, indiscriminately. (2) The hybrids thus obtained are very perfectly self-fertile; those produced from *H. vulgare* (fem.) and *H. distichon* (m.), and those from *H. vulgare* (fem.) and *H. Zeocriton* (m.) even cleistogamous. (3) The hybrids of the first generation partake in general of a middle shape between the two parents. An exception to this rule was made by those of *H. nudum* (fem.) and *H. trifurcatum* (m.), a great part of which proved to belong to the not expected common intermediate form between *H. vulgare* and *H. distichon*. A few specimens belonged to the expected *cornutum* form. (4) The seedlings from hybrids obtained by self-fertilization are very various. The speaker obtained, besides a few already known ones, some quite new varieties. It was remarkable that the third generation of a cross between *H. vulgare* (fem.) and *H. Zeocriton* (m.) produced *H. hexastichon*. (5) In the present summer, a cross effected in 1884 between *H. distichon* (fem.) and *H. trifurcatum* (m.) produced a form almost completely without awns.—M. Fürbringer imparted the results of a research made by M. J. F. van Bemmel into the origin of the forelimbs and of the lingual muscles in reptiles.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Electric Lighting; Its Present Position and Future Prospects: Hammond and Co. (Whitehead, Morris, and Lowe).—A System for the Construction of Crystal Models on the Type of an Ordinary Plant: John Gorham (Spon).—An Introduction to the Science and Practice of Photography: Chapman Jones (Hilife and Sons).—Religion and Science: W. Fitzgerald (Hodges, Figgis, and Co.).—A Practical Decimal System for Great Britain and her Colonies: R. T. Rohde (E. Wilson).—The Rothamsted Experiments on the Growth of Wheat, Barley, and the Mixed Herbage of Grass Land: Prof. W. Fream (Horace Cox).—Rock-Forming Minerals: Frank Rutley (T. Murby).—Smithsonian Report, 1885, Part 2 (Washington, U.S.).—The Glasgow and West of Scotland Technical College Calendar, 1888.

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