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time, he takes it out, and draws and extends it between his hands till it becomes exceedingly thin, thinner, perhaps, than the finest paper. In this state it is laid on the article to be varnished, and to which it adheres. When used with gold and silver leaf, as is often the case, the gold or silver is placed between two folds of the varnish, and thus applied: the fold on the inside is to make the whole adhere, and that on the outside is to varnish and protect the gold and silver, which shine through, and produce a good effect. The varnish combines readily with various colouring substances, which the people there use with it.—*Trans. Soc. Arts*, xliv. 192.

II. CHEMICAL SCIENCE.

1. *Heat evolved from Air by Compression.*—By a mathematical investigation of the heat extricated from air, when it undergoes a given condensation, and by a reference to the experiments of Clement, Gay-Lussac, and others, Mr. Ivory finds, that “*the heat extricated from air, when it undergoes a given condensation, is equal to three-eighths of the diminution of temperature required to produce the same condensation, the pressure being constant.*” Air, under a constant pressure, diminishes 1-480th of its volume*, for every degree of depression on Fahrenheit’s scale; and therefore one degree of heat will be extricated from air, when it undergoes a condensation equal to $\frac{1}{480} \times \frac{3}{8} = \frac{1}{1280}$. If a mass of air were suddenly reduced to half its bulk, the heat evolved would be $\frac{1}{2} \div \frac{1}{1280} = 640$.—*Phil. Mag. N. S.* i. 89.

2. *On the Action of a Moving Metallic Disc, upon a portion of a Voltaic Conductor.*—Immediately after the highly interesting discovery made by M. Arago, relative to the effects produced reciprocally by magnets and metallic plates, when the one or the other were put into a state of motion, M. Ampère was led by his views of the nature of magnetism, to look for a similar effect, when the magnet was removed and replaced by a conducting wire formed into a helix, for when an electric current is sent through such a wire, it is found to possess all the properties of a magnet. A double spiral was formed from wire, and delicately suspended above a horizontal disc of copper, to which a rotary motion was given by convenient apparatus, also of copper. The two extremities of the wire forming the helix were plunged into two circular cups, or troughs, filled with mercury, and placed in communication with the poles of a voltaic battery; a screen was placed between the copper-plate and the suspended spiral. Immediately upon moving the plate, the spiral began to turn in the same direction, precisely like a magnetic bar, or like the assemblage of two vertical magnets attached to a horizontal lever. Ultimately the rotary movement became accelerated and continuous. Upon altering the direction

* At 32° F.—ED.

of the motion in the disc, the motion of the spiral immediately changed, in all cases continuing the same as that of the plate. This satisfactory fact is a powerful addition to those by which M. Ampère supports his views of the nature of magnetism generally, and its origin in all cases from currents of electricity.—*Bull. Phi.* 1826, p. 134.

3. *Influence of the Aurora Borealis on the Magnetic Needle.*—A luminous arc produced by an aurora borealis was seen on the 29th of April, 1826, at Carlisle and in Roxburghshire. This phenomenon was not seen at Gosport, though the sky was very clear. At 7 h. 50' P.M. of the 29th April at Paris, the north point of the needle indicating diurnal variations was 4' to the east of its ordinary position; at half past eight o'clock it passed westward with a ready movement; at three-quarters past eleven o'clock it had returned within half a minute to the position it had at half-past eight. Long experience has taught me that these great oscillations, at hours when the needle is generally stationary, is an indication almost certain of the existence of an aurora borealis. M. Arago, the author of these observations, then ventures to announce, solely from the effects he has observed upon the magnetic needle, that brilliant aurora boreales will have been observed in some part in the north on the following days of the year 1826: the 16th of January, the 10th and 13th of February, the day of the 9th of March, the morning and evening of the 23rd of March, and the 29th of the same month, the 9th and 13th of April, the nights of the 17th and 18th of April, the 24th of the same month, &c.—*Annales de Chimie*, xxxiii. 421.

4. *Electro-chemical Appearances.*—M. Nobili has been induced to contract one of the poles of the voltaic pile in the manner first pointed out by Dr. Wollaston, namely, by inclosing a wire within a glass tube, and exposing only a sectional surface, and has observed the effects which occur when such a pole is used in the decomposition of various saline solutions, the other pole being a plate of metal, brought very near to it. The general results appear to be two in number. The first consists in the property remarked of certain electro-negative substances to attach themselves, in certain determinate circumstances, to the surface of those metals which are least oxidable, in thin regular layers, so as to present the beautiful phenomenon of coloured rings in a splendid manner. This effect, it is supposed, may be applicable in the ornamental arts. The *second* is, that when electro-negative substances are not deposited in thin plates upon the metals, they generally attack their surfaces, not in an uniform manner, as might be supposed, but by a gradation of intensity from the centre, continued and decreasing, but at irregular intervals, following, as it were, a law analogous to that of *interferences*. The same phenomenon is observed in the attachment of electro-positive substances to the negative pole, namely, an alternation in the circles of oxide and of metal. M. Nobili then