

an immense number of points in the same pair are acted on at once by the fluid ; hence rapid and considerable disengagement of electro-caloric which is immediately urged forward by the electro-motive force, and conveyed by the conductors. These large plates without being numerous, ought to produce a great calorific effect, because each voltaic element or pair, produces in a tempuscule given, a quantity of electro-caloric at least proportionate to its surface, and perhaps even in a higher ratio.

It is not the same with the apparatus of many small plates. The quantity of electro-caloric disengaged in the tempuscule given, being proportionate to the surface of the plates will be inconsiderable, because of the smallness of that surface. It is urged forward by the electro-motive force at the instant of its production, and it traverses the series of elements without ever becoming considerable, because the initial disengagement was small, and cooling would diminish its quantity whilst passing the numerous metallic communications from one couple to another.

On the other hand, this apparatus will be far more effectual in producing chemical decompositions than the other, because the chemical action is probably dependant on the electro-motive action, and it increases with it, and this in a given interval of time ; it is much more frequent, and consequently more productive in an apparatus with many plates than in one with few : thus, for instance, suppose 100 of the electro-motive and decomposing vibrations in a second of time, an apparatus with six pair of large plates would only produce 600 of these active vibrations in a second, whilst an apparatus with 500 pair of small plates would produce $500 \times 100 = 50,000$ similar vibrations in the same time.

It may be also that the extreme abundance, and so to speak, violence of the electro-caloric current in the apparatus with large plates, injures its chemical effect by the mechanical impulsion which the current exerts on its entrance into the fluid to be decomposed ; whilst in the many small plated apparatus, the current of electro-caloric being less powerful, and the vibrations more numerous, the polar decomposing effect is more energetic.

These *thoughts*, M. Pictet judiciously adds, are merely given as *conjectures* ! they wait the result of experiments, to be either confirmed or rejected.—*Bib. Univer.* xvi. p. 293.

17. *Electro-Magnetic Instruments invented by M. de la Rive.*—Two excellent little instruments have been invented by M. de la Rive, of Geneva, to illustrate the various phenomena of electro-magnetism, with very little trouble, and at a very trifling expense. The first consists of a small voltaic combination attached to a cork ; the plate of zinc is nearly half an inch wide, and extends about an inch and a half below the cork, its

upper end passing through the cork to the upper surface; the slip of copper is the same width as the zinc, but passes round the zinc, being opposed to both its surfaces as in Dr. Wollaston's construction, its upper end also appears through the cork. A piece of copper wire, covered with silk thread, is coiled five or six times, and tied together, so as to form a ring about an inch in diameter, and the ends of the wire are connected, one with the zinc, and the other with copper slip above the cork. When this small apparatus is placed in water slightly acidulated by sulphuric acid, the voltaic apparatus is active enough to make the ring highly magnetic; and by presenting a magnet to it in different directions, it may be attracted or repelled, and presents all the phenomena of a mobile conducting wire.

The other apparatus is also a little voltaic combination hung from a cork, but the plates are connected together, not by a ring of wire, but by a helix. The helix is made of similar wire to the ring, it is about one-third of an inch in diameter, and the two ends of the wire are returned through the helix till near the middle, when they are made to pass to the outside between the spirals, then being connected with the upper ends of the plates, the helix lies on the cork, with its two ends equally distant from the centre, the course of the electricity being along the wire, from one end of the helix to the other, and then back to the plates. When placed on acidulated water the helix becomes magnetic, and its extremities become opposite magnetic poles, being attracted and repelled by the poles of a magnet, just as another magnet would be in the same situation.—*Bib. Univer.* xvi. p. 201.

These little instruments took their rise from the floating needle of M. Naef. This was composed of a strip of silver and one of zinc connected together, bent, and floated on cork. These, when placed on acid, were attracted and repelled by the magnetic pole.—*Bib. Univer.* xvi. p. 120.

18. *Contact in Voltaic Electricity.*—In making experiments in voltaic electricity and electro-magnetism, where numerous repetitions of contact between wires are required, it is extremely useful, if these wires are copper, to rub the ends over with a little nitrate of mercury; an amalgam is thus formed on the surface of the copper, which does not oxidate or become dirty as copper itself does, but remains bright, and fit for voltaic contact for a long time. M. F.

19. *Magnetism by Electricity.*—M. Van Bech has remarked, that a very slight degree of common electricity is sufficient to produce magnetism in a needle. A helix was made, and an unmagnetized needle placed in its interior; then one end being held in the hand, the other was brought near the conductor of

an electrical machine, and sparks passed to it. After a number of these had been taken, the needle, on examination, proved to be magnetic.—*Bib. Univer.* xvii. p. 23.

20. *New Electro-Magnetic Apparatus.*—Since the paper in the preceding pages has been printed, I have had an apparatus made by Mr. Newman, of Lisle-street, for the revolutions of the wire round the pole, and a pole round the wire. When Hare's calorimeter was used to connect with it, the wire revolved so rapidly round the pole, that the eye could scarcely follow the motion, and a single galvanic trough, containing ten pair of plates, on Dr. Wollaston's construction, had power enough to move the wire and the pole with considerable rapidity. It consists of a stand, about three inches by six, from one end of which a brass pillar rises about six inches high, and is then continued horizontally by a copper rod over the stand; at the other end of the stand a copper-plate is fixed with a wire for communication, brought out to one side; in the middle is a similar plate and wire; these are both fixed. A small shallow glass cup, supported on a hollow foot of glass, has a plate of metal cemented to the bottom, so as to close the aperture, and form a connexion with the plate on the stand; the hollow foot is a socket, into which a small cylindrical bar magnet can be placed, so that the upper pole shall be a little above the edge of the glass; mercury is then poured in until the glass is nearly full; a rod of metal descends from the horizontal arm perpendicularly over this cup; a little cavity is hollowed at the end and amalgamated, and a piece of stiff copper wire is also amalgamated, and placed in it as described in the paper, except that it is attached by a piece of thread in the manner of a ligament, passing from the end of the wire to the inner surface of the cup; the lower end of the wire is amalgamated, and furnished with a small roller, which dips so as to be under the surface of the mercury in the cup beneath it.

The other plate on the stand has also its cup, which is nearly cylindrical, a metal pin passes through the bottom of it, to connect by contact with the plate below, and to the inner end of the pin a small round bar magnet is attached at one pole by thread, so as to allow the other to be above the surface of the mercury when the cup is filled, and have freedom of motion there; a thick wire passes from the rod above down perpendicularly, so as to dip a little way into the mercury of the cup; it forms the connecting wire, and the pole can move in any direction round it. When the connexions are made with the pillar, and either of the wires from the stand plates, the revolution of the wire, or pole above, takes place; or if the wires be connected with the two coming from the plates, motion takes place in both cups at once, and in accordance with the law

stated in the paper. This apparatus may be much reduced in size, and made very much more delicate and sensible.

M. F.

III. NATURAL HISTORY.

§ MEDICINE, &c.

1. *On the Use of Iodine in Medicine, by Dr. Coindet.*—Since the first discovery of the use of this substance, in cases of bronchocele, particular notice has been taken in this Journal of the results of its application, and the conclusions to be drawn from them. See x. 191, and xi. 407. In another memoir, published by Dr. Coindet, and of which the principal points will be condensed below, a new, and in many cases better mode, of administering it is pointed out, and its good effect in scrofulous cases detailed, with the advantages which will probably result from its use in this disease.

It appears that many of the dangerous symptoms caused by iodine, may be attributed, some to its local action upon the mucous membrane of the stomach, which with some persons, cannot bear the remedy uninterruptedly administered, or in increased doses, with impunity; and others to its particular action on the lymphatic system.

The symptoms belonging to these two actions differ essentially. The second action is that which, when properly directed, gives the remedy its usefulness. In order to avoid the first, Dr. Coindet endeavoured to introduce it into the system by other ways than the stomach. An ointment was made, of $1\frac{1}{2}$ ounce of hogs'-lard, and half a drachm of hydriodate of potassa. A piece of the size of a nut was prescribed night and morning, to be rubbed in on the goitre, or the enlarged scrofulous glands, or those of the neck. In the first case of its administration in this way, the tumour softened after eight days of friction; in fifteen days the diminution was much greater, and the tumour had divided into many small lobes, distinct one from another; at the end of a month it had entirely disappeared, without any other effect being produced by the iodine.

After that twenty-two persons were treated in the same way. Above half the number were cured in between four and six weeks, and the others to a greater or less degree.

Iodine, thus introduced into the absorbent system, presents the same results as when administered internally. The duration of treatment, the thickening and softening of the skin, the softening of the goitre, its diminution and separation into many cists, tumours, or lobes, the cessation of oppressed respiration, and alteration of voice, are exactly the same.