

employed, were now injected into the circulation of a dog. He instantly lost all power of motion; the breathing became slow, the pulse hardly to be felt. In ten minutes it was 84; in twenty minutes at 60; in an hour at 115, with the respiration so quick as scarcely to be counted. In two hours the pulse was 150, and very weak. In the mean time the animal was purged; and he vomited, first a bilious fluid, and then bloody mucus; and after lingering in an extremely languid state five hours, expired.

On dissection, the internal coat of the stomach and intestines were found inflamed in a greater or lesser degree universally.

The facts here adduced, says the author, go as far as it is possible to prove that the action of *Colchicum autumnale* on the different parts of the body is through the medium of the circulation, and not in consequence of its immediate effects on the stomach.

On the Cutting Diamond. By William Hyde Wollaston, M.D. Sec. R.S. Read May 2, 1816. [*Phil. Trans.* 1816, p. 265.]

The author, having never met with any satisfactory explanation of the property which the diamond possesses of cutting glass, has endeavoured, by experiment, to determine the conditions necessary for this effect, and the mode in which it is produced. The diamonds chosen for this purpose are naturally crystallized, with curved surfaces, so that the edges are also curvilinear. In order to cut glass, a diamond of this form requires to be so placed that the surface of the glass is a tangent to a curvilinear edge, and equally inclined laterally to the two adjacent surfaces of the diamond. Under these circumstances the parts of the glass to which the diamond is applied are forced asunder, as by an obtuse wedge, to a most minute distance, without being removed; so that a superficial and continuous crack is made from one end of the intended cut to the other. After this, any small force applied to one extremity is sufficient to extend this crack through the whole substance, and successively across the whole breadth of the glass. For since the strain at each instant in the progress of the crack is confined nearly to a mathematical point at the bottom of the fissure, the effort necessary for carrying it through is proportionally small.

The author found by trial that the cut caused by the mere passage of the diamond need not penetrate so much as $\frac{7}{16}$ th of an inch.

He found also that other mineral bodies recently ground into the same form are also capable of cutting glass, although they cannot long retain the power, from want of the requisite hardness.

An Account of the Discovery of a mass of native Iron in Brasil. By A. F. Mornay, Esq. In a Letter to William Hyde Wollaston, M.D. Sec. R.S. Read May 16, 1816. [*Phil. Trans.* 1816, p. 270.]

This mass was first discovered in the year 1784 by a person of the name of Bernardino da Mota Botelho, while looking after his cattle;

and in consequence of the account he gave, the Governor-General of the province ordered it to be brought down to Bahia. A stout waggon or truck was conveyed to the spot; and after three days' labour, the mass was lifted upon it, and by the force of forty pair of oxen was removed about a hundred yards, as far as the bed of a neighbouring rivulet, but there relinquished. And there it was found again by Mr. Mornay in January 1811; but the river was at that time quite dry, and frequently is so.

The mass is about seven feet in length, its breadth four, with a thickness of about two feet. Its form is very irregular, with various cavities, especially on the under side; but the author estimated its capacity on the spot to be full twenty-eight cubic feet; and hence the weight is conceived to be about 14,000 pounds.

Its colour is that of a dark chesnut, rather glossy on the top and sides; on its underside it is covered with a crust of oxide in thick flakes.

In some of the smaller cavities were imbedded quartz pebbles, too large to be taken out without being broken. The block *in situ* appeared to be highly magnetic, having its north pole lying in a N.E. direction; but the fragments separated from it were not found by Mr. Mornay to possess magnetic poles. In detaching these fragments he experienced very considerable difficulty, although aided in some measure by a crystalline texture, which gave direction to the fractures, and was visible in all the specimens he could obtain with a sledge-hammer carried for that purpose.

Having dissolved a small portion of this iron, and examined the solution by such re-agents as he happened to possess, he thought that he discovered the presence of nickel, but very doubtfully, and in very small quantity. He also made a similar examination of some fragments from a bed of oxide found where the mass had been originally discovered, and with a similar result as to an apparent trace of nickel.

The surface of the country was at this spot covered with a coarse gravel to the depth of ten or fifteen feet above the level of the rock of granite, which in general prevails.

The latitude of the place was estimated by Mr. Mornay to be $10^{\circ} 20' S.$, and the longitude about $33^{\circ} 15' W.$ of Bahia.

To the southward were found prismatic fragments, and balls from a few inches to nearly three feet in diameter, supposed to be basalt; and beyond these, at the distance of forty leagues, a range of sandstone hills, from which there extends a sandy plain with occasional elevations, all about twenty fathoms in height, as if they were the remains of some more elevated plain, of which certain parts were more durable from a cement of iron that appears in the beds of most of them. A peculiar aspect is also given to this plain by other smaller hillocks, which are very numerous, and are the nests of the white ants: these are conical in their outline, but almost invariably elliptic at their base.

The soil of the valleys is observed to be impregnated with sea-

salt, which the inhabitants wash out for their own consumption ; but it is very impure, from a mixture of bitter purgative salt along with it.

There are here many warm springs, of which several are as much as 8° above the surrounding atmosphere ; and one of them was at 90° , while the temperature of the air was only 73° .

Among the vegetable productions of this country observed by Mr. Mornay, is one very remarkable for the light which it yields when cut. It is described as a climbing plant, destitute of leaves, and without thorns. It contains a milky juice, which exudes as soon as the plant is wounded, and appears luminous for several seconds. This juice is extremely acrid, so as to blister the skin, even of quadrupeds, to which it is applied. It becomes viscid by drying, and turns of a greenish-yellow colour, appearing to be a gum-resin.

It is conjectured that this plant may be an *Euphorbium* ; but as the author had not the good fortune to find it in flower, he had not the means of learning with certainty to which tribe of plants it may belong.

Observations and Experiments on the Mass of native Iron found in Brasil. By William Hyde Wollaston, M.D. Sec. R.S. Read May 16, 1816. [*Phil. Trans.* 1816, p. 281.]

The observations here added as an Appendix to Mr. Mornay's paper, relate to the crystalline texture of the mass, and its magnetic qualities. The experiments were undertaken for the purpose of ascertaining the presence of nickel more certainly than Mr. Mornay had been enabled to do, and also to discover the quantity of this ingredient.

The crystalline forms in which this iron breaks, are such as are common to many metallic substances ; the regular octohedron, tetrahedron, or rhomboid, consisting of these two combined.

With respect to magnetism, it is observed, that the fragments are precisely like any pieces of the best soft iron, easily obeying the magnet, and instantly assuming polarity, according to the direction in which they are placed with reference to the magnetic meridian, and as instantly changing it when reversed. And hence it is inferred that the magnetic polarity of the mass is solely from similar induction.

For detecting the presence of nickel, the author dissolves a very small portion in nitric acid, evaporates to dryness ; and after dissolving the oxide of nickel in pure ammonia, he precipitates by triple prussiate of potash.

But for determining its quantity, he adds sulphuric acid to the ammoniacal solution ; and after evaporating to dryness, he expels the ammoniacal salts by heat, and then dissolves the residuum, which is mere sulphate of nickel, and, by crystallization, obtains it in a state from which the quantity of metallic nickel can be inferred. By this process he found four per cent. of nickel in this specimen of native