On the Position of Aluminum in the Voltaic series. By CHARLES WHEATSTONE, Esq., F. R. S.*

Having, through the kindness of Dr. Hofmann, been permitted to examine a specimen of aluminum prepared by M. Claire-Deville, I availed myself of the opportunity to ascertain one of the physical properties of this extraordinary metal, which it does not appear has been yet determined, viz: its order in the voltaic series. The following are the results of my experiments.

Solution of potass acts more energetically and with a greater evolution of hydrogen gas upon aluminum, than it does on zinc, cadmium, or tin. In this liquid aluminum is negative to zinc, and positive to cadmium, tin, lead, iron, copper, and platina. Employed as the positive metal, the most steady and energetic current is obtained when it is opposed to copper as the negative metal; all the other metals negative to it which were tried became rapidly polarized, whether above or below copper in the series.

In a solution of hydrochloric acid aluminum is negative to zinc and cadmium, and positive to all the other metals above named. With this liquid also copper opposed to it as the negative metal gave the strongest and most constant current.

Nitric and sulphuric acids, are known not to act chemically in any sensible manner on aluminum. With the former acid diluted as the exciting liquid, aluminum is negative to zinc, cadmium, tin, lead, and iron. The current with zinc is strong; with the other metals very weak, and it is probable that their apparent negative condition is the result of polarization. When aluminum is immersed in dilute sulphuric acid, this metal appears negative to zinc, cadmium, tin, and iron, but with lead, on which sulphuric acid has no action, the current is insensible. In both these liquids copper and platina are negative to aluminum, and notwithstanding the apparent absence of chemical action on the latter metal, weak currents are produced.

It is rather remarkable, that a metal, the atomic number of which is so small, and the specific gravity of which is so low, should occupy such a position in the electromotive scale as to be more negative than zinc in the series.

Monster Mortar Guns.†

The *Horatio* steam frigate is preparing, at Sheerness, to receive two of the monster mortar guns invented, and it would now appear already constructed, by Nasmyth. These guns are 10 feet 6 inches long, and in diameter at bore, 13 inches; muzzle, 31½ inches; base, 40 inches. The weight of each is about 23 tons. It is slung on Captain J. Robert's plan, and will throw a solid spherical shot of 302½ lbs. with a charge of 30 lbs. of powder. The construction of the bomb-proof iron-cased floating mortar-vessels has been kept very quiet, but we now learn that they are

* From the Lond., Edin. and Dub. Philos. Mag., August, 1855.

† From the London Builder, No. 632.