

ones as well—by lining them with a tube of iron or steel. Into this controversy we have no intention to plunge; but it appears that both gentlemen have succeeded in producing useful weapons, which deserve some attention at the hands of our Government. Mr. Frazer's improvements in the construction of heavy ordnance may be said to have brought the coil system to the utmost perfection of which it is capable, and we are now in possession of smooth-bore guns, weighing 12 tons, and capable of firing 40lb. to 60lb. charges with perfect safety. How they will stand rifling remains to be seen; we are disposed to believe with success. In any case these guns are heavier than anything to be found in the French navy, and they are capable of doing fearful execution on 4in. and 4½in. armour plates. It is strange that the Admiralty refuses to adopt the best method of plating—as far at least as regards keeping out shot—yet produced, that invented by Mr. Chalmers. We shall possibly return to this question ere long. At the present moment reliance is placed principally on mere thickness of metal, and although the small armoured vessels designed by Mr. Reed have been successful upon the whole, that success is not sufficiently encouraging to render it likely that the growing tendency to construct enormous vessels will be at all abated. We find with some pleasure that in addition to the iron-clad frigate *Hercules*, ordered to be built at Chatham Dockyard, the Lords of the Admiralty have decided on the construction there of the first of an entirely new kind of turret ship (?) combining all the latest improvements in that particular principle of construction. The preparation of the designs for the new vessel has been entrusted by the Admiralty to Mr. Reed, from whose plans and under whose superintendence the new turret ship will be built. She is intended to carry two turrets, each plated with armour of enormous thickness, and sufficiently powerful to mount 600-pounder Armstrong guns. In the drawings and plans for the *Hercules*, now in course of preparation at the Chatham Dockyard, Mr. Reed originally designed that vessel as combining the broadside and turret principles in the same ship; but, in consequence of the decision of the Lords of the Admiralty, just determined upon, to have an experimental vessel built entirely on the turret principle, the turrets intended to be placed in the *Hercules* will be dispensed with, and she will accordingly be constructed as a broadside ship, with armour plates exactly double the thickness of those of the *Achilles* and *Warrior*. The new turret ship will be built simultaneously with the *Hercules*. We are anxious to know what part Captain Coles will be permitted to take in her construction and design.

In telegraphy, the entire interest of the scientific world has been concentrated on the Atlantic cable expedition. It may be urged that notwithstanding what we have said in the first paragraph of this article, here the engineer has been beaten. But such a statement would not be true. Until the entire scheme of an Atlantic cable has been given up it is useless to talk of defeat; and the failure of the last attempt was due to a concatenation of circumstances with which engineers had very little to do. The subject is disagreeable and we think it better that it should be suffered to repose with the cable

in the depths of mid ocean. We feel no hesitation in stating that the expedition failed from causes over which the engineer had no control, and which would render an attempt to lay a cable between Kingstown and Holyhead an equally uncertain and difficult undertaking. We can only hope for better things in future, and we heartily wish the company every success in their renewed attempt. There is in our opinion small hope that the old cable can be raised, and we think the less time wasted in the endeavour the better. We believe that the construction of the new cable has been commenced, and, with due precautions there is nothing to prevent 3,000 miles of its length from being paid out with as much success as 1,600 miles of its defunct predecessor.

During the past year the world has lost many men of eminence. Sir Joseph Paxton and Captain Fowke, the designers of the glorious structure of 1851, and of the much abused, and we must add, the highly meritorious edifice of 1862, have both gone to their rest. John Dixon, of Darlington, the compeer of the elder Stephenson, has also passed away. What a flood of memories must the announcement of his unexpected decease have brought to those who fought the first battles of our magnificent railway system. Nicholas Wood, too, has gone to his rest full of years and renown. Mr. Neilson, the inventor of the hot blast; Mr. Appold, so well known for his centrifugal pumps; Mr. Elkington the patentee, and in one sense the inventor, of electro-plating, and many others—some of greater, some of less note—have been taken from us, leaving their works and their example as engineers and men as an heritage to posterity, the memory of which shall never pass away.

THE CALDER SOAP WORKS, WAKEFIELD.

(From the London "Grocer.")

"Commencing our survey of the premises, we are taken by our guide to the furnace-room, where the preparation of the black ash or crude soda is going forward. This furnace occupies a large square in the centre of this room, which contains also a series of iron tanks. The use of these will be presently explained. To produce the soda, three substances are required, namely, sulphate of soda, carbonate of lime, and coal. These are mixed together in certain proportions, cast into the reverberating furnace, and tapped or drawn off, when fused to a liquid state, into iron cars holding about four hundred weight each. These cars are wheeled to a convenient distance, emptied, and the calcined mass, which when cool bears the appearance of a worthless cinder, is broken with hammers into small lumps and transferred to the tanks, where in combination with hot water, by which the carbonate of soda is dissolved, it forms the solution so indispensable to soap makers. The proportion of carbonate of soda contained in the black ash, we are informed, averages about twenty-two and a half per cent. The lye is not, however, ready for use, for it contains impurities consisting chiefly of a compound of sulphur, and to prove the presence of this our guide dipped a sixpence into the tank, which was instantly acted on by the sulphur.

"The operation of extracting the sulphur is one