

tracted by this artillery, and the experiments that Government made with it afforded convincing proofs of the practical value of the Essen manufactory. These guns at that time were of very small calibre, but Herr Krupp was continually experimenting with them, until he finally succeeded in producing those gigantic pieces of artillery which are now world-famous. Indeed, it is asserted that upwards of 15,000 cast-steel guns have, up to the present time, been made by the Essen establishment, and disposed of in various quarters of the globe. In the Philadelphia Exposition of 1876, Krupp exhibited many wonders that startled even Americans, accustomed as they are to all kinds of mechanical wonders.

Altogether the establishment covers a superficial area of 1,000 acres, about 190 of which are covered with buildings. In the year 1877 the Krupp foundry possessed 1,648 various kinds of furnaces, 298 steam-boilers, 77 steam-hammers, 294 steam-engines, ranging from two to one thousand horse-power, or altogether 11,000 horse-power, and 1,063 other kinds of machines.

To keep all these foundries employed Herr Krupp possesses several mines in various parts of Germany, and even at Bilboa, in Spain, whence the metal is brought by a regular line of steamers to the mouth of the Rhine, and thence conveyed by rail to the furnace. Although the number of people employed by Herr Krupp in the performance of these various labours is little short of 15,000, they all work together under their employer's skilful direction with the regularity of a machine. The daily consumption of coal by this army of workers is about 2,200 tons. The creature comforts and requirements of his people are carefully provided for by Herr Krupp. He has had 3,277 dwellings erected for his clerks and workmen, in which everything needed has been thought of. Fire and life insurances, invalid and pension societies, hospital, bathing establishments, four people's schools, besides an industrial school for girls and work school for women, all proclaim the thoughtfulness of Herr Krupp, their founder and benefactor. Herr Krupp, a few weeks ago, had in his employ 23,000 men; but new orders have just obliged him to hire an additional force of 8,000, which places him at the head of the population of a small city—more than 30,000 men. The Rothschilds only, of all Kaiser Wilhelm's subjects, return a larger income than Herr Krupp. Not even the Rothschilds set in motion so many hands.—*North American Manufacturer.*

WATER-TIGHT BRICK WALLS.

Some of the technical journals are publishing as novel, a method of rendering brick work impervious to moisture by the application of a soap and alum wash. The recipe is good enough to be recalled to the attention of engineers and architects, but it should not be put forth as new. It has been known in England for at least 20 years as "Sylvester's process," and was successfully applied to the interior walls of the gate houses of the Croton reservoir in the Central Park in New York City, in 1863, on the advice of the late William L. Dearborn, C.E., and under the immediate supervision of George S. Greene, Jr., C.E., now the Engineer in Chief of the Department of Locks. The process and its results in this case are described fully by Mr. Dearborn, in a paper read by him before the American Society of Civil Engineers, May 4, 1870, and published in the transactions of the society as No. XVI., Vol. I., p. 203, from which the following description is condensed:—The process consists in using two washes or solutions. The first composed of $\frac{3}{4}$ lb. of Castile soap dissolved in one gallon of water laid on at a boiling heat with a flat brush. When this has dried, 24 hours later apply in like manner the second wash of $\frac{1}{2}$ lb. of alum, dissolved in four gallons of water. The temperature of this when applied should be 60° to 70° F. After 24 hours, apply another soap

wash, and so on alternately, until four coats of each have been put on. Experiments showed that this was sufficient to make the wall water-tight under 40 feet head of water.

At the time of application the walls had been saturated and the weather was cold. The gate chambers were covered over and heated thoroughly with large stoves. The drying, cleaning the walls with wire brushes, and applying the mixture took 96 days. Twenty-seven tons of coal were used for the drying and one ton for heating the solution. 18,830 square feet of wall were washed with four coats.

The drying and the cleaning of the walls costs $6\frac{1}{2}$ cents per square foot, and the plant, materials and labour of applying the wash cost $3\frac{3}{4}$ cents per square foot.

From my own notes of the work I take the following which may be of interest:

Two men using the brushes, with four helpers, laid a wash on 3,766 square feet per day. For every 1,000 square feet surface there was needed for each coat of the mixture $6\frac{3}{4}$ lbs soap and $2\frac{3}{4}$ lbs. alum. The cost of the soap and alum was 13 per cent. of the total cost of the work, not including the drying by stoves and cleaning the wall. For application to a clean wall, the cost would be made up thus: soap and alum, 13 per cent., labour, 23 per cent.; scaffold and tools, 19 per cent.; superintendence, 15 per cent.—*Sanitary Engineer.*

AN IMPORTANT PROJECT.

We are informed that owing principally to strong representations on the subject which Mr. Bunting has made to the Minister of Railways and Canals, Sir Charles Tupper has decided to have a thorough survey of the valuable water power of the new canal, with a view to having it utilized with the least possible delay. He suggests that an engineer be instructed to prepare a diagram, and ascertain and determine the exact amount of the enormous water power, which specially interests the milling and manufacturing community, and to get a detailed report of length of levels, diagrams of available water-power, etc., with a view of making complete and exhaustive official reports for public purposes; and make known the advantages presented in this locality for manufacturers and millers. The columns of American and Canadian journals will be largely used. This is a good scheme, and will doubtless result in much benefit to this country, and as it can scarcely fail to bring into it many capitalists who will utilize the excellent water power provided, for supplied as it is from an inexhaustible reservoir, Lake Erie, there is no reason why the Canal should not be a large source of wealth to those investing in manufactures, as well as to the country at large.—*Welland Telegraph.*

HOW WILL IT END?—It is not many months ago that our markets were glutted with American flour, and now that the mills are again working to their full capacity, with the crop of 1881 before them, the possibility—to say nothing of the probability—of an equally large exportation of flour from the Atlantic ports of the United States, is doubtless being discounted at the present time. Independent of this consideration, our rates are now high enough to attract supplies from the continent of Europe, and these, in little, are forming a total which is not inconsiderable. There is a very marked tendency to be noted, in respect of all the wheat-exporting countries, to send us the manufactured product in place of the raw material; and it is impossible to discount the influence which this turn of the trade may eventually have on the milling industry of the country.—*Mark Lane Express.*

WHERE THE GRAIN GOES.—The total elevator capacity of the United States in 1880 is put down by the statistician at 92,000,000 bushels. Of this amount New York gathers in 23,800,000 bushels; Chicago 20,450,000 bushels and St. Louis 8,900,000 bushels.