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WHITE NICKEL BRONZE.

Pending the legal decision of the questions at issue with regard to processes of nickel-plating, manufacturers of nickelized wares are likely to be specially interested in a plan which is being developed in France looking to the substitution of nickel bronze for nickel plated iron or brass.

An ore of nickel, garnierite, is found in extensive deposits in New Caledonia, the French penal colony east of Australia, and are there worked by Messrs. John Higginson & Co., of Nouméa. On preliminary roasting the garnierite yields a regulus containing from 60 to 70 per cent of nickel, which is shipped to the works of the French company, at Septèmes, near Marseilles, where it is smelted into ingots and granules containing 99½ per cent of pure nickel and ¼ per cent of utilizable metallic substances. The extent of the mineral deposits in New Caledonia, the reduction in the cost of freight owing to the concentration of metal through the preliminary fusion, and the economy effected by the new methods of reduction devised by M. Jules Garnier, enable the company to sell the pure metal at about one-half the price it obtained three years ago.

After many experiments the company have succeeded in rolling and forging the pure metal; but greater success is attained by mixing the pure metal with various proportions of copper, zinc, and tin, forming nickel bronze. Twenty per cent of nickel suffices to give the desired tint and to secure inoxidizability. All articles now made of brass or copper, nickel plated, can be produced in solid bronze by the same processes and with the same plant, and at practically the same cost. So made they are 20 per cent stronger, and may generally be much lighter. Its great strength and the property of non-oxidization make this alloy eminently suitable for mathematical and musical instruments.

A small quantity of nickel added to steel increases its hardness and renders it inoxidizable, while edge tools made of the alloy stand better than those of ordinary steel. A nickel bell metal is also found to give good results. The Paris Exhibition of 1878, says the Journal of the Society of Arts, proved the action of a totally new system of metallurgy in connection with this beautiful metal; and that of 1879 showed its practical introduction into most branches of manufacturing industry.

THE EXPORTATION OF AMERICAN MANUFACTURES.

Many of our manufacturers have suffered grave disappointment from the difficulties encountered in obtaining a lucrative foreign trade. To make the best article of its class, and at the lowest first cost, do not of themselves open the door for a demand from other countries. The manufacturer and his home customers may, indeed, be the only ones who are willing to concede that his product is the best, but supposing that proper means have been taken to inform the buyers of distant markets, and that there may be tacit agreement on this point, there are still other and quite as weighty considerations which enter into the problem. Our exports of manufactured goods in any considerable quantities commenced but yesterday, as it were. The agricultural interests have so largely predominated here that the growth of any one manufacturing industry has been generally gauged by the approximation we were making to the supply of the home demand, and in almost every department, except in articles of food, we have always heretofore been large importers. In 1873 there commenced a steady diminution in our imports, with a corresponding growth in our manufactures. In this way we at once cut down the largest and most valuable trade of the manufacturers of England, France, and Germany. They have had hard times there, and reduced the prices of many kinds of goods to so low a figure that, with wages much below ours, it has been impossible for their manufacturers to make the 2½ or 3 per cent interest on their capital which is the most that many of them expect. It is, therefore, with foreign competitors in this condition that our manufacturing industries have become so flourishing as to lead to large expectations of a profitable export trade.

More than this, also, the foreign manufacturers who used to supply us so largely, and have labored so strenuously to maintain their hold, have likewise been the caterers for the other foreign countries to whom we now desire to sell goods. For more than half a century English manufacturers have had branch agencies in nearly every quarter of the globe where it was possible to find a market for the productions of English workshops, and, to a less extent, this has also been true relative to French and German productions. They have well established business relations, and know the wants of customers, thus holding a great advantage, even as against better goods at lower prices. And with these agencies, as with their principals at home, it necessarily follows that they will make the most strenuous efforts to keep what trade they have. Their money is invested in it, and the capital of foreign houses is generally much larger in proportion to the amount of business done than is the case here, so they are able to give long credits, while being satisfied with rates of interest too low to tempt American investors.

Notwithstanding all these obstacles, however, the great superiority of many articles of American manufacture, which, from our improved machinery and better methods, can be produced at a lower cost here than similar goods of an inferior quality can be made abroad, undoubtedly affords solid grounds for expecting a steady growth in our exports of manufactures. Comparing the imports for the year ended June 30, 1879, with our receipts of foreign manufactured

goods in 1873, the great falling off which has been shown in six years ought to be as encouraging to us as it has been discouraging to foreign manufacturers. In watches and watch movements this decrease amounted to \$2,354,226; in manufactures of cotton, \$14,821,141; in flax goods \$5,734,549; in iron and steel and their manufactures, \$49,861,304; in copper and its manufactures, \$3,392,389, and in lead and its manufactures, \$3,183,813. In nearly all of these articles, however although we still continue to be liberal importers, we have a steadily growing export trade—nothing to be compared to the great increase we have had in the exports of farm produce, it is true, but amply sufficient to prove that our manufacturers, while rapidly covering the field at home, are successfully competing for foreign custom. The results have thus far, in many cases, seemed small, in proportion to the efforts put forth, but this is just where the characteristic impatience of American manufacturers and the nervous impetuosity of American business men are most apparent. They do not fully appreciate the character and extent of the competition they have had, and are far from attaching such importance to the progress they have already made as is given to it by their foreign competitors themselves. It has been a life-or-death struggle with the latter, and, with every advantage they have had, they now see that American competition, which was scarcely known ten years ago, will have to be met hereafter in all the leading markets of the world, in every prominent description of manufactured goods. In cotton and woolen manufactures, in machinery, railway supplies, and general hardware, as well as in hundreds of minor articles of which we formerly imported a large part of what we consumed, they see that the manufacture is now established here on such a basis that they will have more to fear from us hereafter than they have heretofore had from competition among themselves. The recent advance in tariff rates by Germany, the efforts to impose higher duties by France, the talk about "protection" even in England, all have their origin in the fear of American goods, and such considerations should encourage our manufacturers to put forth still further efforts in many branches of business where we have as yet made but little more than a commencement.

NEW JERSEY MINES AND MINERALS.

The annual report for 1879 of the State Geologist, George H. Cook, gives, in addition to other valuable matter, a large amount of information touching the mineral resources of New Jersey. The list of iron mines includes nearly 300 separate openings, ranged in four parallel belts known as the Ramapo, Passaic, Musconetcong, and Pequest. The output for the year 1879 was 488,028 tons, an increase of 19 per cent upon the year before. At the close of the year there were eleven furnaces in blast with a capacity of 3,210 tons a week, and three spiegel furnaces making 132 tons a week. The State has in all seventeen stacks, with a yearly capacity of 300,000 tons.

The zinc mines produced a little short of 22,000 tons of ore.

The statistics of the clay deposits give evidence of a prosperous year. The figures for the clay district of Middlesex County, according to the three principal groups of pits, are as follows:

Table with 2 columns: Description of clay pits and quantity in tons.
1. Woodbridge—Fire clay, fire sand, kaolin, and fire brick, shipped... 115,060
2. Claybanks north of the Raritan River—Fire clay, fire sand, and kaolin... 90,000
3. Claybanks south of the Raritan River—Fire clay, fire sand, and kaolin... 60,000
Total refractory materials... 265,060

The product of the mines and pits of stoneware clay in Middlesex County is set down as 10,000 tons, or about half that of the previous annual output. The clay banks on the Delaware side of the State yielded 31,847 tons of refractory materials.

The red brick works along the Raritan and South rivers did not begin to be worked to the full capacity until September. The product for the year was 87,000,000; this year it is expected to be 110,000,000.

The greater part of the products of the eastern part of the State is manufactured into fire brick, retorts, drain pipe, terra cotta, and wares, at works in the neighborhood of the pits. The employment of the dense clay of the Raritan fire clay stratum for glass pots is likely to be successful. This clay burns very solid and free from checks, resembling in this respect the best of the foreign clays imported for making crucibles and glass pots and strong fire brick. This clay is abundant, and can be sold for half the price of the imported clay. The finer grades of white clay from the vicinity of Woodbridge and Amboy are extensively used in the manufacture of cream-colored and white granite wares. They are good for mixing with the less plastic Delaware clays, but do not burn white like kaolin clays. A practical method of removing the oxide of iron would be a valuable discovery, as it would permit the use of these clays in place of the more costly and less plastic clays now employed. Several new uses for New Jersey clays have been recently developed, with promise of great advantage to the State. The potteries making white ware at Trenton, Elizabeth, and Jersey City number 101 kilns, producing \$2,500,000 worth of wares a year, or more than half the whole product of the country. They employ 3,000 hands, and pay out \$1,250,000 a year in wages.