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SUCCESSFUL GERMAN AND BELGIAN COMPETITION WITH GREAT BRITAIN IN THE IRON TRADES.

There has been a remarkable development of the iron trades in Germany and Belgium in the last few years. The serious inroads which the competition of these countries is making upon fields, both at home and abroad, which were supposed to be firmly controlled by the English manufacturers have stirred up the British trade to make special inquiry into "the methods and conditions under which Continental manufacturers—more particularly those in Belgium and Germany—were enabled to compete so successfully with those in this country (Great Britain), not only here, but also in neutral markets." The delegation was composed of both employers and employed; and its mixed nature—the fact that it was so well qualified to judge the question from the two standpoints of capital and labor—make its findings of special interest, not merely in Great Britain, but in any country which, like our own, is a large producer in the iron and steel trades.

It appears that the cost of raw material, such as coal and pig iron, differs very little in England, Germany, or Belgium; and that it is in the process of manufacture that the Continental firms show such superior economy. The extent to which these nations have been able to underbid the British manufacturer may be judged from the following figures: "In 1882 Great Britain produced 8,493,000 tons of iron, against only 3,380,000 tons produced in Germany. In that year the British produced 5,014,000 tons of finished iron and steel, or about double the output of Germany. Since then, however, the annual German production of pig iron has advanced to 5.380,000 tons, and the output of finished iron and steel to 5,927,000 tons, while the British production of pig iron has declined to 7,364,000 tons, and the British output of finished iron and steel has dropped to only a trifle over 4,000,000 tons; so that Germany is now producing a considerably larger quantity of finished products than is Great Britain. Belgium has not during this period made anything like the same relative progress as Germany, but the output of Belgian steel has, nevertheless, more than doubled during the last ten years, and the capacity of production is now three times what it was in 1880." The report ascribes the rapid development of the iron industry to the "steady character of the workmen," and to the fact that strikes are very rare among the German operatives. The delegation were impressed with "the splendid discipline maintained," and there was a military exactness and regularity in the performance of orders. The visitors were struck with the "splendid physique of the men employed in the works, and not less so with their sobriety and steadiness." This not only insures a larger week's wage to the workman, but the employer "gets the maximum production out of his plant, no heats being lost through broken time, etc."

It appears that, as between England and Germany, there is not so great a difference in the wages as is generally supposed. They are lower in Germany; but on the other hand there is a larger relative number of men employed in a German mill. One secret of their economy is seen in the fact that there are no highly paid head "mill contractors," as in an English mill; the oversight being left entirely to the engineer. As the result of its investigations the delegation report, "the general distribution of wages is more evenly balanced, and we do not find the extremes that obtain among English workmen."

RAPID TRANSIT IN NEW YORK CITY.

We note with pleasure that ex-Mayor Abram S. Hewitt, in his testimony before the Rapid Transit Commission, advocates an immediate extension of the elevated roads on the lines indicated by us in our last issue.

Mr. Hewitt is opposed to the construction of an underground road beneath Broadway, both on technical grounds and because of the unavoidable obstruction to traffic which must arise during its construction. He suggests the Elm Street route as being more feasible. At the same time, he affirms that whichever route be adopted, it will be at least five years before the scheme would be completed and in operation; and that it is imperative that some immediate scheme of relief be carried out to meet the pressing needs of the hour.

"Most of the difficulty," said Mr. Hewitt, "which exists to-day and which will exist during the next five years during the construction of this road would be met by an arrangement between the Rapid Transit Board with the Manhattan Elevated Company for additional tracks and express trains. To-day the most important consideration for New York City is not the construction of the road, but that the existing elevated structures should be strengthened, increased, and put in a condition to move the people up and down town at a rapid transit rate of speed. When I say this, I want it understood that I have no axes to grind and I do not hold a single share in the elevated or the New York Central Railroad. I say, however, that the elevated road should get every facility to increase their means of transportation."

We heartily agree with the ex-mayor in his conviction that the elevated system should get "every facility" in carrying out this sorely needed extension. It seems to us that the question is purely one of expediency, and that it should be judged as such. The improvement of our transportation facilities is a matter of compromise, in which the benefits which will arise from the doubling of the elevated tracks are to be weighed against any inconveniences which might result therefrom. The existing roads are a disfigurement to the streets in which they run, it is true, but the mere addition of extra tracks and strengthening of the existing structures can scarcely make that disfigurement any more complete than it already is; and if the complete removal of one nuisance can be obtained at the cost of a slight increase in some other, common sense would suggest that the change be made.

If, on the other hand, the question is not one of pure expediency, there must enter into it, as Mr. Hewitt's words would suggest, an element of sentiment or prejudice. The elevated system is, or at any rate has been, an enormously profitable investment, it is true; but it has also been an enormous public convenience. If the general public, or the body that administers its affairs, is willing to submit to the present intolerable overcrowding, rather than contemplate a possible increase in the profits of the corporation which serves its needs, and is seeking to serve them more effectually, it is collectively guilty of the sin of cutting off the nose to spite the face—a species of folly which is supposed to be remotely possible in the individual, but never in a collective body of men.

A Large Gun Making Combination.

Several of the largest gun making establishments of the United States have combined to form what is to be called the American Ordnance Company, with Gen. Albert R. Ordway as president. The firms in the agreement are said to be the Driggs-Schroeder Ordnance Company, of Philadelphia: the American Projectile Company, of Lynn, Mass.; the Hotchkiss Company, and a torpedo company of Providence, R. I. It is stated that the Bethlehem Company, of Bethlehem, Pa., and the Gatling Gun Company, of Hartford, are also in the new combination. The company will have its headquarters in Washington, and a big plant for the manufacture of projectiles and guns will be started at once at Bridgeport, Conn. The reason given for the organization of the new company is that the separate companies are unable to cope successfully with the large European establishments, while a concentration of their capital will permit them to do so. The new concern will endeavor to obtain the trade of South and Central America and of the Asiatic governments.

Refinements of Measurements.

Refinements of measurements have gone to almost incredible limits. On lenses curvatures of 1-150,000 inch can be measured. In spectroscopic analysis of mere traces of different elements, fractional wave lengths are read to 1 2,500 millionth of an inch. Professor Dewar in his researches on liquid air attained a vacuum of 1-2,500 millionth of an atmosphere by filling a vessel with mercurial vapor and exposing it to a very low temperature, and Professor Boys, with the simplest possible arrangement of quartz fiber, torsional balance, and mirror, claims to have been able to just detect an attractive force of the 1-20,000 millionth of a grain. So much for minute weights and measures, and as regards angles the Darwin pendulum will indicate a movement of 1 300 of a second, which would be about the angular measurement of a penny piece at the distance of 1,000 miles. It is difficult to realize the minuteness of measurements like the preceding. The smallest gold coin of Great Britain, if drawn out into a wire 1-2,500 millionth of an inch diameter, would be long enough to stretch to the sun and back again ten thousand times, and yet the fundamental mystery of the constitution of atoms and molecules would be locked up in every infinitesimal portion of the length of that minute wire. "For the establishment of a truer and more comprehensive theory of elasticity," write the authors of the last important work on the subject, "we shall probably have to wait until we gain a wider acquaintance with the nature of intermolecular action."—Engineering Mechanics.

DR. MAX WOLF'S method of detecting minor planets by photography is described in a recent number of Nature. He uses a 6 inch portrait lens of 30 inches focal length in his telescope, which gives him a field of about 70 square degrees. To make sure that the trails of the planets are not defects in the plates, two photographs of each region are taken, with an exposure of two hours. A positive and a negative are put together with the films in contact where the trails appear as a continuation of each other. Another method is to look at the photograph through a stereoscope, the planet then appearing in relief. Dr. Wolf has never looked through the telescope at any of the many planets he has discovered by the photographic method.