

by the Timoshenko formula which apparently tends to prove its correctness, as the Timoshenko formula is one of late date and apparent reliability.

### GREAT BRITAIN AND THE STEEL TRADE.

THE position held by Great Britain in the steel trade of the world was the subject of an article appearing in a March issue of "Made in Britain," from which the following abstract is made:—

Living, as we are, in the steel age, it is perhaps not surprising that the mind instinctively classifies nations according to their relative positions as iron and steel producers and traders. The non-technical man, therefore, on the strength of a tradition that was until recent years acknowledged throughout the world, unhesitatingly places Great Britain first in the list. Thirty years ago that idea would have been quite sound, for then Great Britain was by far the largest iron producer in the world, with an output of nearly  $7\frac{1}{2}$  million tons of pig-iron—the raw material of all iron and steel products—compared with some 4,000,000 tons in the United States, about 3,700,000 tons in Germany and 1,500,000 tons in France. To-day, however, Great Britain takes a bad third place, with an output of only  $10\frac{1}{2}$  million tons of pig-iron, while the United States leads with about 30 million tons under normally prosperous conditions, and Germany takes second place with about  $19\frac{1}{2}$  million tons. The production of pig-iron, however, represents only part of the case, so we may examine the next stage—the manufacture of steel in its preliminary or ingot form. Here the position is relatively similar, the United States retaining a hopeless lead and Germany more than doubling British production. In passing, it may be remarked that the growth of the German steel output has been almost phenomenal; it has trebled in about the last fifteen years.

The moral to be drawn from the foregoing facts, however, is not that Great Britain is decadent, as some wise men with a little knowledge would have us believe; the fact is that she obtained a good start in the matter of industrial progression and the development of natural mineral resources, and placed herself in a position which was not really in keeping with her size, population or resources. America, on the other hand, was a country in practically the infancy of development and it was not then known that her natural resources of coal and iron—the two essentials for a great steel industry—were so immense as to dwarf those of the older countries. We now know that it is vain to dream of competition with America in the matter of quantity of coal and iron output, though that fact, of course, does not discount the importance from a commercial standpoint of the British coal and iron industries. To-day we have, and are likely to retain for very many years, a vast coal-exporting business, amounting in 1914 to 62,000,000 tons, exclusive of 18,500,000 tons shipped as bunkers, while the fact that in the same year we exported 4,000,000 tons of pig-iron and manufactured iron and steel (apart from machinery of all sorts, hardware, etc., and ships), testifies to the hold which we have kept on the world's markets.

When it is recalled that these exports included railway rails and material, plain and shaped bars of a large variety, joists and girders, hoop and strip iron and steel, sheets and plates, tinplates, galvanized sheets, forgings, castings and a variety of other descriptions representing the sale of a large amount of skilled labor and technical knowledge in manufacturing, it will be seen that Great Britain, though superseded, is not useless in the steel trade.

A fact that is of interest is, that the rise of the German industry has been chiefly due to the technical discovery in the early 'eighties of two Englishmen—Thomas and Gilchrist—who, by the discovery of what is known as the basic process of steel making, rendered valuable and usable the hitherto useless phosphoric ores of Germany. The same process has permitted the economic development of one of the greatest ore fields in Europe—that lying in the Lorraine area and extending into both French and German territory. This fact incidentally explains the rise in the French iron production from about  $1\frac{1}{2}$  million tons in 1886 to  $5\frac{1}{2}$  million tons in 1913.

Not only has Great Britain given a lead to the world in the inception of the great steel age, but she has been in the front rank in the scientific and technical discoveries that have produced the modern steels on which engineering in all its branches is now dependent. The limitation set by the nature of wrought iron—the chief form of commercial iron in the days before Bessemer astonished the world by his process of producing what is now known as mild steel—rendered the progress of engineering, as we now understand the term, practically impossible. The cost of producing steel by the pre-Bessemer process confined the material to tools and similar appliances, and all stuff for work of any size was perforce a combination of wrought iron and cast iron. To-day we have almost every grade of steel, from mild forgeable qualities suitable for the varied requirements of the structural engineer to the tool steels of glass-scratching hardness and which will cut other steels and cast irons at even a red heat—a thing which would have been accounted an extraordinary absurdity a few years ago. British initiative and research is responsible for these developments also.

In the face of these facts there would appear to be no reason for pronouncing the decadence of Great Britain in the great steel industry, nor is there any cause for such a pronouncement in a general sense. The world is continually presenting new fields for the disposal of steel and iron products of every description, from the raw pig-iron and the plain bar of steel to the highly-complex finished machine or locomotive; and Great Britain is still one of the countries to which consumers in these markets first appeal. The years of steady development of plant and machinery, processes and technical skill, cannot be duplicated readily; even the raw materials are handy in a new country. Moreover, many countries (Sweden and Spain are good examples) with ore resources lack fuel resources, with the result that they are rather exporters of raw material to Great Britain and other producers of manufactured goods, than producers themselves.

### PUBLIC WORKS IN BRITISH COLUMBIA.

The estimates of expenditure of the British Columbia Government includes appropriations for the Public Works Department of \$3,171,850. This sum includes \$598,100 for works and buildings and \$2,466,800 for roads, streets, bridges and wharves. Mr. J. E. Griffith, Deputy Minister and Public Works Engineer, informs us that his department purposes proceeding with the extension of the court house at New Westminster, the preparation of the site for the government buildings at Prince Rupert and the erection of several schools and other buildings throughout the province. There will not be much new work undertaken this year in connection with highways, states Mr. Griffith. The funds are ample, however, for the carrying out of extensive improvements to existing roads and for the proper maintenance of the present highway system.