

through the whole engineering world, from the main engines and boilers to the captain's sextant and chronometer, from the trees in the forest down through the woodworking section, from the main deck to the high art furniture and carvings in the saloon. Her equipment cannot be provided without the assistance of the cloth-maker, the potter, the glass-worker, the cutler, and without the hundred-and-one other members of the world's industrial organization, contributing each his share to the production of the finished article. The cost of almost every article in the ship, coming under either of the above headings, is at least one-third higher in Canada than in Britain.

Next, heavy forgings, such as stern frames, rudder frames, connecting rods, propeller shafts, steel engine castings, etc., are considerable items in the cost of a modern steamship. All have to be imported and pay a heavy Customs duty, because the larger sizes are not made in Canada, and even the smaller sizes which are made here are excessively costly, owing to the extremely limited demand for them. The same remark applies to steam windlasses, steam winches, electric lighting machines, steam steering gears, and scores of other items too numerous to mention.

In all these matters the British shipbuilder is 25 to 35% ahead of the Canadian. The latter cannot lay down his raw material (plates, bars and rivets) at so low a price as the former by 10%, exclusive of freight charges, if he desires to save time by purchasing in the U.S.

However desirable it may be that Canadian makers of these goods should be protected to the extent of this preference during the earlier stages of manufacture, and until an increased demand will justify its discontinuance, that does not make it any easier in the meanwhile for the shipbuilder who has to compete with those who can obtain the same articles at 25 or 30% less cost. It is true that a Customs tariff of 25% on machinery and 10% on the hull is levied on new ships purchased abroad and registered in Canada which, apparently, is so much in favor of the Canadian builder, but this is purely a negative concession, and is really operative only as to ships purchased in the U.S., because British ships registered in Britain or Newfoundland are not subject to the tariff, and, consequently, are brought in freely, clear of duty.

Then, as to labor: It was recently shown at the meeting of naval architects in New York, last Dec., that the difference in cost of wages, paid by daywork, between American and British shipbuilders, averaged 25% throughout all trades in favor of Britain. Now, the wages paid in Canada for mechanics and laborers differ but little from the wages paid on the other side, certainly not more than from 10 to 12½%, consequently the British shipbuilder is also 12½ to 15% ahead on his cost of labor. Even assuming that the Canadian mechanic, although paid higher wages, can, by reason of his superior energy and ability (which is at least questionable), perform the labor of building the hull at as low cost per ton of material used as the British mechanic, it is still manifestly impossible for the Canadian shipbuilder to produce the finished ship at the same cost as the British shipbuilder.

Many steamers have been brought into Canada during the past 10 years from Britain, sufficient in number and importance to have permanently established steel shipbuilding had conditions been favorable for building them here, but the industry has been carried on since the building of the first steel ship, the *Manitoba*, in May, 1889, in a desultory and perfunctory manner, producing only a class of vessels mostly too small or otherwise unsuitable for crossing the Atlantic; in fact, although the business has had a precarious ex-

istence of 12 years, only two cargo steamers have been built during that time.

It will be argued that the manufacture of plates and bars in Canada, which is at last within measurable distance, will give the Canadian manufacturer a better chance to compete with the British, and to a limited extent this is true, but it will not go far to offset the wide difference that exists in the general conditions.

Canada as a manufacturing nation is just emerging from the age of swaddling clothes, but, even after arriving at maturity, she will never be in a position to compete economically with Great Britain in the building of ships, until fiscal and other conditions are so equalized that the Canadian and British shipbuilder can meet on equal terms. By a wise policy of fostering the manufacture of steel, she has laid the foundation stone of her future greatness and prosperity (and no nation in these days can become great before making iron, for that is the condition precedent in this industrial age), but it must not be forgotten that a foundation without a superstructure is of little utility.

The future development of the iron and steel industry in Canada will require cargo steamers to handle its raw materials and finished products to an extent that cannot be gauged at this moment, and the possibilities of future requirements for moving the products of the Northwest, which will be equally in proportion to the growth of the country, are simply incalculable. The coming century will probably witness in Canada a gigantic industrial development similar to that which occurred on the other side of the line during the last century, and the Canadian shipbuilder is wondering how he is to be able to participate. The only way to create a flourishing and successful industry is to encourage the establishment of works in which everything necessary for the building and equipment of a ship from keel to truck shall be made right here in Canada, and to provide some means whereby the Canadian shipbuilder can obtain an equivalent for the superior conditions enjoyed by his British rival.

Our astute friends and neighbors to the south realize the magnificent possibilities foreshadowed by the creation of a merchant marine, and are organizing a national attempt to place the shipbuilders of the U.S. upon an equal footing with those of Great Britain and Germany (other nations do not count in this connection), and they propose to spend \$20,000,000 a year for the next nine years to achieve that object. Who can doubt that such a step will prove a profitable investment, or that its effect will have world-wide reaching consequences? What better precedent can be found for similar action on this side when the conditions are so nearly alike? Until something of the kind is accomplished, steel shipbuilding will continue to languish in Canada, for capitalists are naturally conservative, prone rather to embark in undertakings where a moderate return is certain, than to venture into the realm of experiment where the alluring brightness of possible results is too often obscured by events unforeseen and unprovided for.

This subject forms an essential portion of the still unsolved transportation problem, the most vital public question of this generation to the people of Canada. The construction and enlargement of the canals of the Dominion have cost over \$70,000,000, but where are the Canadian cargo steamers which should be utilizing them on the Great Lakes? Unfortunately they can almost all be counted on one's fingers, and those mostly British-built ships. Until means are adopted for fostering the construction of steel ships in Canada, the transportation problem will remain unsolved, and the first story of the superstructure of Canada's future greatness (to be raised upon the foundation laid by the manufacture of iron and steel), will remain unbuild.

Aids to Navigation on the Great Lakes.

A joint deputation representing the Lake Carriers' Association, the Underwriters' Association of Canada, and Canadian vessel owners visited Ottawa recently to submit a number of recommendations to the Department of Marine. The deputation comprised Capt. T. Donnelly, of Kingston, Chief Inspector of the Canadian Lloyds; Capt. J. Gaskin, Capt. G. P. McKay, of Cleveland, Chairman of the Lake Carriers' Association's Committee on Aids to Navigation, and W. J. White, K.C., of Montreal.

In the absence of the Minister of Marine they were received by the Deputy Minister, and after a discussion of the various points written recommendations were handed in as follows:—

RULES OF THE ROAD.

On behalf of the Lake Carriers' Association I am instructed to call your attention to the difficulties which have arisen in regard to the rules of the road which now prevail upon the Great Lakes. After careful consideration the U.S. Government has adopted certain modifications in the rules which prevail upon the high seas, and these modifications have been made applicable to all vessels navigating in American waters upon the Great Lakes. The rules which govern Canadian vessels within the territorial jurisdiction of Canada are contained in the Revised Statutes, chap. 79. It has been found in practice that particularly during the periods when fog prevails great difficulty is experienced by navigators in exactly locating the boundary line. Cases have arisen in which accidents have happened very close to this line, and had the commander been following the rules of the nation outside of whose territorial jurisdiction he was, the courts would in all cases have decided adversely to the owners of his vessel.

We think there is no doubt that the matter is fully within the jurisdiction of the Parliament of Canada, inasmuch as it was found necessary by the legislation we have referred to, to make the international rules applicable in Canadian waters. We, therefore, desire that legislation should be introduced amending the present rules in one or two important particulars, viz.:—

That sec. 2 of sub-sec. 3, which is referred to as article 3, should be amended in such a way that in all cases only two lights should be displayed at the mast head instead of three as now provided for. The rule in the U.S. reads as follows:

"Rule 4. A steam vessel having a tow other than a raft shall, in addition to the forward light mentioned in sub-division (a) of rule 3, carry in a vertical line not less than 6 ft. above or below that light a second bright light of the same construction and character, and fixed and carried in the same manner as the forward bright light mentioned in said sub-division (a) of rule 3. Such steamer shall also carry a small bright light abaft the funnel or after mast for the tow to steer by, but such light shall not be visible forward of the beam."

Article 15, sub-sec. (a) of the Canadian act provides that a steam vessel having way upon her shall sound at intervals of not less than two minutes a prolonged blast. The American rule applicable in such cases is that a steam vessel under way, excepting only a steam vessel with raft in tow, shall sound at intervals of not more than one minute three distinct blasts of her whistle.

Under article 28 of the Canadian rules, one short blast means, "I am directing my course to starboard."

It has been found in practice that those in control of the vessels have sometimes confused the fog signal under the British and Canadian rules with the signal under the American rules to pass to starboard. As has been pointed out above, if this mistake occurs in