

The Province of Quebec has every natural requirement for the production of charcoal pig iron, and the value of such an industry to the province and the Dominion must be fully recognized by every one. We have the iron ore, and while we have neither coal nor natural gas, we have plenty of hard and unmerchantable, or waste woods, and that fact makes it possible for the establishment of an iron industry of the greatest value, and I see no reason why such an industry should not be carried to a successful issue, as it has been in Sweden and the United States. What is wanted, however, is the assurance of an adequate supply of charcoal, both for the present and the future. To do this some steps must be taken by our Government to conserve certain woods or portions of forests, so that this industry can be established on a permanent basis. How this can be done is something that will have to be carefully thought out, but if it is done, the value to Canada will be great. If it is not, then we will have wasted a very large proportion of our forest wealth, for that is wasted which is not used to the best advantage, and I hold that more profit can be derived from our unmerchantable and waste woods by utilizing them and conserving them to the development of the charcoal iron industry, than in any other way. If this is done, the establishment of the industry is possible and certain; if it is not, then it can only be carried on in a very desultory way.

One of the principal difficulties that stand in the way of the establishment of the charcoal industry in some of the districts is the fact of large tracts of land being held by limit holders. Limit rights were originally intended to convey an area valued for its merchantable timber alone, yet the limit holders, even in cases where the merchantable timber has been removed, still retain possession and control, with the result that the hard and unmerchantable wood cannot be utilized. The only way by which these woods can be diverted is by actual settlement, and, as in a great many cases, the land may not be suitable for agricultural purposes, the wood, if these conditions are to exist, is practically inaccessible.

Another great difficulty is the lack of knowledge in regard to charcoal burning. Of course, so far as kiln practice is concerned, men can be readily obtained, or educated to good practice, but for pit burning it is necessary that a much broader system of education than could be carried on by a private enterprise should be adopted, as a knowledge of pit burning would be of the greatest value to our settlers and farmers in the wooded districts.

Now, these two questions are, I hold, provincial and national ones, and these difficulties should be considered and overcome by our Governments.

In Sweden there are national schools for charcoal burning, which have done and are doing good work in training men and spreading information throughout the country as to the most economical systems of making charcoal, especially in pits. Both the Dominion and Provincial Governments should follow this example, and disseminate useful information on the subject among the agriculturists, especially in the wooded districts and where charcoal consuming industries have been or can be established. This should be done by lectures, papers, and in every practicable manner. The practice especially of pit burning should be taught in our agricultural institutions, and certainly no mining school should be without a course in charcoal burning,

and when development comes, as it surely should come in a land of wood and iron, national schools should be established, as in Sweden. Our Governments have spent large sums in this way on dairy practice, and we all know that the results have been profitable and satisfactory, and I believe that if the same course is adopted in regard to charcoal making, which is a farmer's and practically a domestic industry, the results will be also to the national good.

Steps should also be taken to prevent the locking up by speculators or others of woods suitable for charcoal purposes, and where this evil exists, as in the cases I have referred to, it should be overcome by just changes in the present laws if necessary. I do not believe that in the case of the limits any value was considered or paid for, nor was it intended to convey to the limit holders the unmerchantable woods for which lumbermen and others purchasing these limits have no use. This is proven by the fact, I consider, that at all times the Government has reserved the right to settlers taking up any portion of the land, the only reservation in favor of the limit-holder being in regard to the merchantable wood, which he is given a certain time to remove. I therefore hold that under all circumstances, and especially where the lands are not suitable for agricultural purposes, and the unmerchantable wood cannot be realized on through the settler, the Government should have the right to divert unmerchantable wood to other purposes when and where it is deemed advisable.

When an enterprise that requires this fuel can be started in any district, it should be especially encouraged by the setting aside of wood lands to insure a continued supply, and by assistance in teaching the principles of "burning" to the inhabitants of the district, and by rebating of stumpage dues where the wood is used for charcoal purposes, and encouragement given in every practicable manner within the powers of the Dominion or Provincial Government.

The industry is, and must always be, if successful, a settler's, a farmer's, and a people's home industry, and for this reason it is especially deserving of national support and encouragement.

Our farmers should be taught and enabled to use to their own and the nation's profit everything the land has to give, and here are mighty crops wasting, burning and rotting that, properly used, might here in Canada, and especially in our own Province of Quebec, be made, as in Sweden, the mainstay of a nation.

This is a "burning" question. Let us hope it will not remain a "burning shame," but in the near future become a "burning" success.

FOR THE CANADIAN ENGINEER.

BOTTOM CONSTRUCTION OF STEEL VESSELS, AND "AFLOAT" STRESSES AND "ASHORE" STRAINS.

BY JOSEPH R. OLDHAM, N.A. AND M.E., CLEVELAND, O.

To calculate the strength of a ship, it is necessary that the stresses which it may encounter be known, as well as the strength of the material of which it is constructed. The one is a measure of the tenacity required, the other of the tenacity possessed, and the strength of the finished structure depends upon the relative proportions of the two.

The discrepancy between "afloat" and "ashore" strains experienced by ships is greater, I think, than generally understood; for instance, I have seen ocean and lake steamers with ten or twenty consecutive floors and frames broken by light grounding, and yet the