

greatly reduced cost over the present ones in use, which are now well known to be extremely wasteful in regard to coal.

We hope the supporters of the designs adopted will not be disappointed, and that the citizens will not have reason to regret the help extended to these supporters, because, if so, they will have nobody but themselves to blame.

The testimony secured by appointing experts to report previous to letting contract, was decidedly unfavorable to the adoption of these very designs and we have it from one of the best authorities that the engines and pumps combined, when supplied by contractor, will be a failure, in point of efficiency and economy, in contrast with what might easily have been obtained from the same local contractors by their following other and much better designs.

A great deal of newspaper controversy was indulged in about the time of awarding contract, and the chief champion of the present designs was one of the local evening newspapers, and no doubt its reasons for so doing were best known and understood by itself, even though unintelligible to many.

Perhaps the supporters of the present engines may find it a harder task to convince the public that the new pumping engines are in every respect all that should be desired.

We do hope that Toronto will not allow itself to retrograde in matters of civic works of improvement, but a calm and candid survey leads to the conclusion that not even yet do appearances direct that way; so that Toronto will have to grin and bear her burdens for some time to come.

STEAM BOILER AND ENGINE ECONOMY.

The subject of efficiency combined with the necessary durability and economy in the use of steam appliances have received in Canada of late years much more attention and consideration than formerly.

When it is considered that heat is the great force operating on, and acting through agents, and that same is derived chiefly and directly from coal or other fuel, it is not to be wondered at, because Canada, especially Ontario and adjacent territory, is unfortunately deprived of coal-fields and have to draw all her supply from the eastern provinces or the United States, frequently paying a high price.

We refer chiefly to the manufacturing centres and not to the lumbering districts where cheap fuel can be had in the shape of the sawdust or other refuse of the mill—the latter are fortunately self-supporting in the matter of fuel and in this respect Canada is as highly favored as any country.

But such Cities as Montreal, Toronto, Hamilton, London, etc., have to spend enormous sums for the necessary suitable fuel for general manufacturing purposes. Although a good deal has been done and still being done in the matter of economy in the use of steam power, there is still room for a more general adoption of the best and most economical appliances from the very furnace and boiler up to the exhausting of heat into the air from the chimney and exhaust pipe of steam engine.

Were the science of heat better understood and not so indifferently treated its importance and value to

Canadian manufacturers would be more than fully established. In some moderately small factories and manufacturing concerns of which Canada has, perhaps, more than her proportion, the saving in the coal bill alone has by strict adoption of economy been the only profit obtained to the concern and yet parties are found who do not believe in the economy of one apparatus over another contenting themselves with the notion that steam is the same no matter how it is obtained and afterwards used.

We would state here that the science of heat is one of the most subtle and difficult sciences there is and requires for its full knowledge a large share of the highest mathematical skill.

We believe it would pay parties contemplating steam application to confer and consult with some recognized expert or firm of consulting engineers and thus secure satisfaction without the worry and after trouble of loss and failure.

The horizontal tubular boiler generally adopted in Canada, we think, everything considered, is the best and most preferable design. It only remains to have it constructed of proper material and well arranged in all its details, to be amply strong and well made for the uses to which it may be put.

The setting of boiler in brickwork is not the least important, while the arranging of grate bars, furnace details, flues, etc., require great care and experience. Next comes the fittings and attachments to boiler proper, the nature and application of these very much determine the durability and safety. Quite as much as the furnace setting, flues, tubes, etc., determine the efficiency of the boiler to evaporate the maximum quantity of water for the minimum of fuel burnt and consumed in grate bars of furnace.

Assuming the boiler to be in satisfactory condition for generating steam, let us go further by assuming its connection with a steam engine. The first point to be watched is to have area of main steam pipe large enough to supply at boiler pressure enough quantity when engine was its maximum at its highest speed for ordinary purposes one-tenth the area of steam cylinder of engine will be enough while the steam ports in cylinder need not be much less than this and the exhaust not greater than one and a half.

The principle which regulates economy in the steam engine are many and quite sufficient, also the regulator of power to speed, but, we propose to return to these and do them some justice in a future article.

To prevent rust, dissolve one ounce camphor in one pound of melted lard; take off the scum, and mix in as much fine black lead as will give it iron color. Clean the machinery, and smear it with this mixture. After twenty-four hours, rub clean with a soft linen cloth.

During the past year a new market has opened in Australia for California fruit, especially the dried article, canned goods and apples. During the past season an average of 10,000 boxes of apples per month have been shipped by steamer from San Francisco to Sydney. The fruit is carefully wrapped in white paper. The Australians do not like large apples, but want medium-sized. There are but few ports in Australia where they will allow apples from foreign countries to land. This is consequence of local legislation, and is intended to prevent the introduction into the country of the codlin moth and other fruit pests.