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CANADIAN MANUFACTURER AND INDUSTRIAL WORLD

DEVOTED TO THE MANUFACTURING INTEREST OF THE DOMINION

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SEE ADVERTISEMENT, PAGE 398.

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FREDERIC NICHOLLS, *Managing Director.* J. J. CASSIDEY, *Editor.*

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OFFICE OF THE ASSOCIATION:

Room 66 Canada Life Building, King Street West, Toronto.

THE offices of the CANADIAN MANUFACTURER and of the Canadian Manufacturers' Association, have been removed to Room 66, Canada Life Building, King Street West, where all communications should be addressed.

COMMERCE BETWEEN CANADA AND THE UNITED STATES.

WE have received a report of theChief of the Bureau of Statistics at Washington, on the imports, exports, etc., of the United States for the three months ending June 30, 1891; appended to which is an abstract of the foreign commerce of that country for the year ending on that date. We select from this report a few items of interest relative to the commerce with Canada.

The imports of merchandise, including coin and bullion, into the United States from the Dominion of Canada during the year ending June 30, 1891, amounted to $39,087,782, as compared with previous year $39,042,977.

The imports in both years include household and personal effects of settlers and of citizens of the United States dying abroad, and articles, the growth, produce and manufacture of that country, returned. They also include various articles of Canadian produce merely passing through the United States for export to foreign countries. The quality of Canadian merchandise of all kinds actually taken for consumption was about $30,000,000. We have good reason for believing that the trade and navigation returns of Canada for 1890-91 will show that the Dominion purchased from the United States during that year, for consumption alone, considerably over $50,000,000, or fully $20,000,000 more than the purchases of the United States from Canada.

There was a falling off in the value of imports into the United States from Canada in 1890-91 in horses, barley, eggs, hay, and sawn lumber; and there was an increase in bituminous coal, fish, beans and peas and potatoes. These are the important items.

By far the most important item of the imports into the United States from Canada was sawn lumber—boards, planks, deals, etc. The report referred to shows that during last year the United States exported to foreign countries sawn lumber to the value of over $2,000,000 more than it imported from all countries. Under such conditions it is clear, as many of the best authorities in that country admit, that the consumer there must pay the duty; and it may be very safely assumed that it was owing to the conviction of this truth that Congress treated Canadian lumber in a different spirit than was exhibited toward most of its other products under the McKinley Tariff. The same rule as to American consumers paying the duty applies to coal, fish and some other articles, applies just as truly as that Canadian consumers would pay the duty on raw cotton, tobacco, coal, Indian corn, pork, products, etc., imported from the United States.

The value of horses, sheep, cattle, eggs, barley, hay, beans, potatoes, etc., exported from Canada to the United States during last year was about $12,000,000. There is no doubt that free trade in these articles would prove very advantageous to many Canadian farmers; but it may be said with equal certainty, that under free trade in Indian corn, oats, hog produce, field seeds, etc., prices in Canada would be greatly depreciated. Nor should it be overlooked that, under free trade in cattle, farmers will imperil, and perhaps lose altogether, the highly favored position they now occupy as to disposal of their cattle on arrival in Great Britain. The value of this privileged condition there is thought to be rather under than over estimated at one million dollars annually.

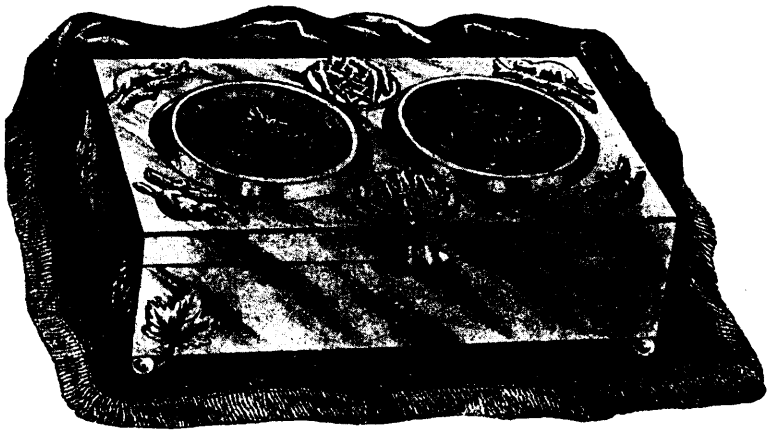
Free trade in raw products between Canada and the United States offers many advantages and disadvantages. On the whole, it is generally conceded, that the advantages would prove greater than the disadvantages. But the contention that the balance of advantage is so great as to demand heavy sacrifice on the part of Canada in order to obtain free trade, is perfectly absurd. Reasonable concessions might be granted, but the proposal that Canada should, by commercial union, deprive itself of the privilege of purchasing in other markets than the United States, is too ridiculous even for discussion. During the year 1889-90 Canada imported from the United States merchandise valued $52,291,970, more than one half of which was raw material; and imported from Great Britain and other countries than the United States, merchandise valued at $60,473,611, nearly all of which was manufactured goods. What can be said of a proposal which implies that, by adopting the United States tariff, we must preclude ourselves from the purchase of any portion of this $60,000,000, which the United States manufacturers may turn out at their own price, and

which, by excluding European competition, will enable these manufacturers to charge higher prices for the goods we are now buying from them? If we are to have free trade, let it be with the world at large. If the country is not ripe for free trade and direct taxation, Canada must preserve and extend its commercial relations with all countries, and must unhesitatingly reject any policy which will embarass it in its fiscal independence or in its liberty of action in future contingencies.

THE CANADIAN MANUFACTURERS' ASSOCIATION MEMORIAL.

THE accompanying illustration is of the beautiful casket, in which was contained the resolutions of condolence of the Canadian Manufacturers' Association to the Baroness Macdonald, of Earnscliffe, relative to the death of her husband, Canada's great Premier, Sir John A. Macdonald.

At a special general meeting of the Association held in Toronto, June 11th last, called to take action upon the death of Sir John, a series of resolutions were passed and a committee appointed to carry them into effect. These resolutions were published in this journal at that time. They were embodied in the form of a small book, the leaves of which were parchment and the cover Russia leather, the text being in quaint and appropriate designs, the work of Mr. A. H. Howard, R.C.A. The casket made to contain this book was of most beautiful and unique design, as will be seen by reference to the illustration. It is a solid silver box heavily lined with gold. On the sides and cover are riveted emblematic maple leaves and figures of the Canadian beaver, in heavy oxydized silver, the monogram of the Association, and the date, 1891, in similar metal, and the obverse and reverse sides of the Association medal in fine bronze. The stems of the maple leaves project below the bottom of the casket, forming the feet upon which it rests. The design of this work of art is exceedingly simple and exceedingly beautiful in its simplicity. It was made by Messrs. P. W. Ellis & Co., manufacturing jewelers, Toronto, and reflects great credit upon them as a specimen of what can be done in this line in this country. The designing for both the resolutions of condolence and the casket containing them were entrusted to officers of the Association.



THE MEMORIAL.

MR. BENNETT ROSAMOND, of Almonte, Ont., president of the Rosamond Woolen Company, and ex-president of the Canadian Manufacturers' Association, has been chosen by the Conservative party of the riding of North Lanark as its candidate for the Dominion House of Commons at the election which occurs the last day of this month.

PADDLE YOUR OWN CANOE.

FREE traders fully agree with the Red Parlor that unrestricted commercial intercourse with the United States would give the Canadian consumer the benefit of cheaper factory goods; and that it would alse ensure better prices for many of the commodities produced by the Canadian farmers, who, in 1881 formed 56 per cent. of the population.—*Toronto Globe.*

A large majority of the people of Canada are engaged in agricultural pursuits, and doubtless agriculture is the largest and most important industry of the country. When the farmers are prosperous, manufacturers are also prosperous; and when the agricultural industries are depressed, the manufacturers are not, nor can they be prosperous. The *Globe* contends that the greater prosperity of Canadian farmers depends upon their access to foreign markets, when they would be ensured better prices for their produce. It is apparent that the fewer people there are engaged in agriculture, and the more people there are engaged in manufacturing and other occupations, the larger the demand will be for farm products, and the larger the profits to the farmer for what he produces. On the other hand the more people there are engaged in farming, and the fewer in manufacturing and other occupations, the larger the quantity of farm produce, and the cheaper it will be sold. So, too, a multiplication of manufacturing industries means a cheapening of manufactured goods, for competition will reduce prices of them as well as of farm produce. It cannot be doubted that the building up of manufacturing industries promotes general prosperity, and that general prosperity increases the value of farms and the demand for farm products. Of course this means better prices for the farmer. The buying and selling of both farm produce and manufactured goods depend upon the law of supply and demand. Anything which increases the demand for either of these lines of goods tends to the elevation of prices and to increase prosperity. The *Globe* contends that manufactures cannot be "cheap" in Canada because the demand is limited; but we know that a diversion of labor from agriculture to the workshop works favorably in two directions:—It restricts the production of farm produce, thereby enhancing its value; and it increases manufactures, at the same time reducing the cost of them. The National Policy induces the establishment of manufacturing industries; these create a demand for labor, and this in turn implies good wages. This diverts labor from agricultural to manufacturing industries, and this employs increased consumption and decreased production of farm products, aud consequently better prices for them.

It is in this way the home market can be made most valuable to the Canadian farmer. We cannot control any other

market but our home market. There might be occasional benefits to the farmer if he had free access to foreign markets, but the price he would have to pay to gain that access is more than the opportunity is worth. The *Globe* has frequently argued that protection creates over-production, that is, of manufactures, and that over-production is the logical and unfavorable result of protection. But this over-production means lower prices, and this is not objectionable to the farmer. Large crops means good times not only to the farmer but to the country at large. A large crop of pig iron—an over-production of it perhaps—would also mean good times to the farmer and also to the country. Why not shape legislation so that the country might experience what it is to regularly have big crops of pig iron. One of the legitimate and beneficial results of protection is larger production. The *Globe* claims that protection leads to over-production, by which the market becomes over-stocked and prices depressed below the cost of foreign goods. Protectionists admit this, claiming that the N.P. stimulates manufacturing enterprises until competition between our own manufacturers increases the supply of their products to the point where the cost to the consumer is reduced as low, or even lower, than would be reached under free trade. The country does not suffer from over-production of manufactures any more than it does from unusually large farm crops.

The disastrous effects upon a country of undue tariff reduction was recently illustrated in the United States. Under the tariff prevailing previous to 1883, the country was in a great condition of prosperity, so much so that the debt incurred in suppression of the rebellion was being liquidated at an astonishing rate. Of course there were those in that country, just as they are in this, who, desirous of attaining to power, raised the cry for tariff reduction. The indefatigable hammering at this question resulted in a revision of the tariff, by which large reductions were made in many lines of merchandise. Immediately following the going into effect of this tariff, great business depression occurred, continuing through the year 1884, 1885 and part of 1886. The tariff reformers claimed that the depression was due to over-production brought on by excessive stimulation of industries through the agency of a high tariff. But this was not true, for during that period of depression the importation of foreign goods into the United States amounted in value to over eighteen hundred million dollars. The exact amount was, $1,880,661,000. How, then, could the depression be caused by over-production while it required, in addition to the home production, this vast volume of foreign products to supply the demand? The depression was not caused by the high tariff, but by the reduction of duties under the revised tariff of 1883. By removing or greatly reducing the duties upon foreign goods, prices became demoralized and unsettled; manufacturers were forced to suspend operations or to run on short time, wages were reduced, and of course consumption was greatly restricted.

Investigation in Canada will show that, if the country is filled with merchandise for which there is little or no demand, it is not of Canadian production. It is imported, and that, too, in the face of our tariff. But of all this imported merchandise it appears that there is but a very small portion of it which could not, just as well, have been produced in Canada; and its presence here implies that to just that extent Canadian capital and enterprise, and Canadian labor have been deprived of employment. Because of this lack of employment our ability to purchase has been restricted, the farmer suffering quite as much or more than any other class. The production of this merchandise gave employment to foreign capital and foreign labor, greatly to our disadvantage. These goods could have been kept out of Canada if our tariff had heen high enough; and we can never enjoy the full benefit derived from producing the goods we require until our tariff makes it possible for us to do so. What we require is a tariff which will secure our own home market to us. In 1890 the value of goods imported into Canada for home consumption amounted to more than $112,000,000. It is true Canada could not produce some of these goods, but a very large proportion of them could be produced here, and this is the measure of what we lose in that way. If these goods were produced here we would consume very much more largely of our products which we now seek to export; and we would have very much less need for foreign markets, either for buying or selling, if we had entire control of our own home market. Any policy which keeps the people actively employed adds to our national wealth. The N.P. does this, for it encourages the building of factories and the employment of labor. Alluding to the great prosperity of the United States, achieved under protection, Mr. Mulhall, of the Royal Society of London, in his *Balance Sheet of the World* says:

It would be impossible to find in history a parallel to the progress of the United States in the last ten years. Every day that the sun rises upon the American people it sees an addition of two and a half millions of dollars to the accumulation of wealth in the Republic, which is one third of the daily accumulation of all mankind outside of the United States.

This is disinterested evidence, testified by undisputed authority. If protection does this for the United States, why should the American people abandon it? If protection does this for that country it will in similar measure do it for Canada. Then why should we abandon protection?

THE GOD-MADE FLOW OF TRADE.

Mr. Stapleton Caldecott is a highly respected merchant of Toronto, engaged in importing and selling foreign merchandise. We are not aware that he is in any way interested in any manufacturing industry in Canada; and he is one of those men who desire to stamp out and crush to death any political system which he imagines interferes with his business. Of course the gentleman is entitled to entertain whatever political opinions he pleases, and in doing this he should be free from journalistic criticism unless he should, upon the rostrum or through the public journals, air his views and become a preacher of politics. If he does this he immediately becomes a fair and legitimate target for journalistic shots, and should expect to see his arguments torn to tatters if they are liable to such catastrophe. Mr. Caldecott has frequently amused himself by telling through the newspapers what he thinks on political subjects, and only a few days ago he had quite a long letter in the *Globe* under the caption "The Restrictionist Policy." In this he tells us that the result of

the N.P. is to restrict trade with other parts of the British Empire and with the United States, and also with the balance of the human race; that it compels the farmer to pay a heavy duty upon the goods he buys from Mr. Caldecott, who buys them in Great Britain, and that it often compels him to purchase inferior goods manufactured in Canada, "and pay a heavy tax to a manufacturer, who proclaims, by his demand for a heavy protection, that nature never intended that he should be a manufacturer at all."

Dear, good Mr. Caldecott should not use such language, for it is simply insulting, and he should not be surprised that manufacturers and sensible people generally should feel indignant thereat. Of course he knows that if it were not for the tariff he could sell more imported goods than he now does; and he knows that if it were not for the tariff it would be utterly impossible for many manufacturers to keep their factories in operation. As it is, these factories give employment to thousands of Canadians, who earn more in them than they could possibly earn by tilling the soil and growing wheat for the British market. But what does dear, good Mr. Caldecott care for the welfare of poor, humble Canadians whose condition is bettered because of the employment they find in Canadian factories? He does not seem to care whether they sink or swim in the fierce struggle for life, so long as Mr. Caldecott makes big profits on British made goods. And then what does dear, good Mr. Caldecott mean when he says that nature never intended that a Canadian manufacturer should be a mauufacturer at all, if his success as a manufacturer depends upon protection? In another place in his letter he quite irreverently uses the term, "God-made flow of trade," and we take it that his intention was to make the words "nature" and "God" synonomous; that God never intended that a Canadian manufacturer who believes in protection should be a manufacturer at all. Is the dear, good man authorized to enunciate God's views on a Canadian trade question? It is either that, or he imagines that he knows more on the subjec than the manufacturers, who are adding more to the honor and glory and prosperity of Canada than all the importers of Mr. Caldecott's stamp in the country.

This dear, good man tells us that protection is a reproach, and that "the only way to get this reproach removed is to change the policy and go in for free and unfettered trade with all who can sell us goods cheaper than we can produce them, or who will buy from us those things nature (God) has amply qualified this great country to grow or make." In other words he wants to smash the N.P. to smithereens so that, Canadian manufacturers being driven out of business, Mr. Caldecott could sell lots more of imported goods than he is now able to work off. How exceedingly unselfish of this dear, good man. And who is to determine what particular articles God has qualified this great country to grow or make? Mr. Caldecott seems to think that he has been endowed with a divine mission to arrange this matter, and that it is to be in the direction of universal free trade. Quite modest, indeed, of this dear good man. The manufacturers are of the opinion that manufacturers and factories are quite as indigenous to the country as such importers as Mr. Caldecott and his big wholesale warehouses. The success of the one depends upon protection, the success of the other upon free trade. Which is of the most value to Canada? Without the factories Canada could never be more than a hewer of wood and a drawer of water for manufacturing countries. With them Canada is prosperous and happy, and the more there are of them the more prosperous and happier she becomes. Without the importers and their warehouses—well, if Mr. Caldecott should go out of business to-morrow the vacancy created by the event, and the disastrous effect upon the prosperity of Canada, would resemble the hole made in the water caused by thrusting the finger into it. Such is the difference in the value to the country of manufacturers and importers of foreign goods.

This dear, good, modern Solomon, this wise man of Toronto, talks about "the restrictive and barbaric custom houses undoing by unnatural restrictions the natural and God-made flow of trade between nations." If free trade is the handiwork of God, as Mr. Caldecott impiously asserts, then the inference is deducible that the gentleman with hoofs and a forked tail has defeated the plan.

THE FIGHT AGAINST PROTECTION.

One of the strangest proceedings that has come under our observation recently is the arguments advanced by Mr. Stapleton Caldecott, an importer of foreign mechandise, doing business in Toronto, against the N.P. This argument consisted in part of an article purporting to have been taken from the New York *Daily News*, which stated that the McKinley Bill had raised the prices upon nearly all the necessaries of life, and which was embodied in a letter written by Mr. Caldecott published in the Toronto *Globe*. It is charitable to suppose that Mr. Caldecott has been imposed upon by some thoughtless person less scrupulous than wise, in supplying him with this New York screed. It was a campaign lie made to do duty in New York and elsewhere in the United States last summer during the then pending elections; and its falsity and ridiculousness were well ventilated at the time. When this lie got started the editor of the *American Economist* made a thorough investigation of it; and in the October 2nd issue of that staunch pretectionist journal was printed a table of prices of fifty articles in common use in that country, showing the price in October 1890, a year before the McKinley Bill was passed, the "campaign prices" of 1891 and the prices since then; also the prices of the same articles in 1857. These figures were gathered from over a thousand different points, and were of such cumulative evidence as no free trader, even Mr. Caldecott, would dare dispute. This able-bodied and fleet-footed lie went the rounds of the press at the time, even finding its way into some Canadain free trade papers; closely followed by the facts as given in the *Economist* and other tariff journals. Mr. Caldecott is justice to himself as well as in fairness to those whom he thought might read his letter, should have informed himself in this matter. He could have done so by reading both sides, and discovering that the lie had been successfully contradicted time and again. If he had this knowledge honesty should have prompted him to refrain from giving further circulation to a free trade lie; if he did not have it, his ignorance is inexcusable.

Mr. Caldecott is a fair representative of those who hold that "cheapness" is the *sine qua non* of trade. This is the free

trade idea. It is that we should always buy where goods are the cheapest, and that any system or policy which restricts trade by the imposition of protective duties is wrong. Protection teaches the contrary. It teaches that the presumed right of the individual to buy where he pleases is subject to restriction with reference to the right of others. Mr. Caldecott may be said to have a general right to spend his money as he will, but he is compelled, nevertheless, to surrender some of it for the public good. He talks of "natural right"—he may have a natural right to do some things, but for the public good he may be restrained from doing these things—from exercising that right. He may have a natural right to buy his merchandise in the cheapest market, but the people of Canada have decided that for him to exercise that right would be in serious conflict with the general interests of the country. Mr. Caldecott might study the effects of free trade in Great Britain. There was the unrestricted natural right to buy cheap silks in France, and now the one time prosperous manufacture of silk in England has almost entirely ceased. There was the natural right to buy cheap sugar in Germany, and now most of the one time prosperous sugar refineries in England and Scotland are permanently closed. There was the natural right to buy cheap laces in Belgium, and now the Nottingham factories are unproductive and almost idle. There was the natural right to buy cheap breadstuffs in the United States and elsewhere, and now the once bounteous fields of England are but pastures and grazing lands. What has cheapness done for Ireland? More than half the soil of that beautiful and fertile land is uncultivated, and the only hope of the people is in immigration to lands where the necessaries of life are not so cheap.

The obligation of the Canadian Government is certainly not to help Mr. Caldecott buy his foreign merchandise at very low prices, but to do what it can to maintain manufactures, thus obviating the necessity of buying abroad, particularly such articles as can be made here at home, making it possible for all the people to have renumerative employment. Protection will do this.

THE TWO TARIFFS.

In discussing the merits or demerits of the Canadian and American tariffs, the Toronto *Globe*, speaking of what this journal had said regarding the unnecessarily high duty imposed by Canada upon refined sugar, suggests that it would pay us to pension off all the workmen employed in our sugar refineries and to grant large annuities to the proprietors, and then to close the works and establish free trade in sugar with the United States. In our opinion this would be silly business. Why free trade with the United States, where refined sugar is worth nearly as much as it is in Canada, instead of with Britain where it is very much cheaper? Or why free trade in sugar at all? Our contention was not that we should have free trade in sugar, but, taking the McKinley tariff as the height to which it would be well to go, adopt the American rate of $10 per ton instead of $16 as it now is.

Of late the *Globe* has become an ardent advocate for a much higher tariff than we now have. It was not always thus, for heretofore it advocated free trade with all the world; but now it abandons that theory and endeavors to show that Canada, under unrestricted reciprocity with the United States with its sixty per cent. tariff, would be better off than to remain where we are with our thirty per cent. tariff, or even to enter into some special arrangement with Great Britain by which our tariff as against that country would be very much less than what it would be as against the United States. It endeavors to tone down the fact that the McKinley tariff was aimed in a hostile and unfriendly spirit against Canadian interests by telling us that in dealing with the price of staples in the two countries it is necessary to go behind the protective duties levied in the States and consider other factors, that in many cases where their duties are higher than ours the price of the article is cheaper there than here, owing to the fact that production costs less. It cites, for example, that the American duty upon bituminous coal is 75 cents per ton while the Canadian duty is only 60 cents, and yet we consume large quantities of American coal. This proves nothing; for it is a fact that the Canadian duty ensures the profitable sale of Nova Scotia coal as far west as Montreal; and it is also a fact that American anthracite is sold cheaper in Toronto than in Chicago or St. Louis. It tells us that the American iron duties are higher than ours, but that the price is lower. The United States had no well established iron industry under a low tariff system; and it was not until the duty was raised to $9 per ton that that country became a competitor in its own home market with Great Britain. A similar policy would undoubtedly effect a similar result in Canada. It is true our population is only five millions, but the *Globe* need not sneer at this, as it does, for we are large consumers of iron and manufacturers of iron, our importations last year aggregating over 600,000 tons. With sufficient protection we would soon have an iron industry which would supply a very large portion of this demand; and under that protection there would be such competition as would result in as low prices here as prevail in the United States. It is true we import from the United States large quantities of agricultural implements, springs, bar iron, cast iron goods, iron and steel forgings, hardware of all kinds, etc., together with pig iron; but the protection argument prevails here also. Under a revenue tariff in the United States, in 1854, the total production of pig iron then amounted to but 736,000 tons, but under protection the production now amounts to about 8,000,000 tons, greater even than the production of Great Britain. So, too, with steel rails. The manufacture of this article was begun in the United States in 1867 when only 2,276 tons were produced, but under the protection of a duty of $17 per ton the production has reached millions of tons a year and the importation of steel rails has about ceased. There are nearly 20,000 miles of railraods in Canada, but not a rail has ever been made here, simply because there has been no duty upon the article; and it is most probable that fifty or a hundred years hence from now, if no duty is levied—no protection promised to encourage the industry—we will be in no better condition than we are now. Neither unrestricted reciprocity with the United States nor free trade with the world will ever give Canada a steel rail industry. But protection would do it. The *Globe's* explanation of the fact that the above enumerated articles are cheaper in the United States than in Canada is that the American iron industry, possessing extraordinary natural advantages, has been developed under

protection at a surprising rate though at enormous cost in times past to the consumer. This is true; but why not apply this fact to Canada? We have extraordinary natural advantages also for the manufacture of iron, and without doubt if we had adequate protection the industry would also develop at a surprising rate; but the cost would not be "enormous" to the consumer, for as we have shown, active competition would prevent it. But even if for a while the cost of production should be greater in Canada than in the United States, would not the result be worth the price? We think it would.

We are told that "the magnificent distances, coupled with the scantiness of the population, enhance the cost of selling goods in Canada and of transporting them from the factory or warehouse to the consumer," and this is one reason the *Globe* gives why we should obtain our supplies from a greater distance and pay more for transporting them. There is no portion of the United States from which such goods may be obtained that is not paralleled and equalled as far as natural advantages go in Canada. Under sufficient protection iron and steel could be made even more cheaply in Toronto than in Buffalo, Cleveland, Detroit or Chicago. It is nonsense to urge the scantiness of our population when we consume 600,000 tons of such goods a year. It is not necessary, either, that all these goods be manufactured in one place, and Canada could well support enough of these places, and would do so if producers could be assured of sufficient protection and a continuance of it for a sufficient term of years. Such establishments as we now have are the equal in point of excellence of production of any similar concern in the United States; but what encouragement is there for enterprising men to erect blast furnaces, or steel works, or rolling mills, or foundries, or machine shops in Canada for the production of these goods when such papers as the *Globe*, and the political party which the *Globe* represents, declare emphatically and continually that the system or policy of the Government which might encourage such enterprises is wrong and vicious, and that it shall be swept away and obliterated if that party should attain to power. This is one of the causes which operate to keep Canada in the position she now holds. The *Globe* and its party desires to subordinate everything to the idea of cheapness. Cheapness is not the most desirable thing for the people, but the opportunity to work and earn the means of buying. Under the operation of the *Globe's* theory instead of Canada possessing a great diversity of industries, as in the United States, and here to not quite so wide an extent, she would be nothing more than a producer of crude materials to be manufactured into merchantable commodities by other people in other countries. We would have no iron works, but we would be producers of ore and fuel. We would have no flour mills, but we would be growers of wheat. We would have no saw mills, but we would find occupation in felling timber.

The United States realized this situation long years ago, and struggled against it un il industrial freedom was attained. Under the blighting influences of free trade ideas the country was dependent upon Britain and other foreign countries for nearly every manufactured article. The raw materials were sent abroad, and the necessaries of life, manufactured of these materials, were imported from abroad. This condition of helplessness was painfully observable in the South during the late war. The chief industry of the people was raising cotton, but no cotton fabrics were made there—they were all brought from England, whither the raw cotton had been sent; and when the firey trial came the bravest men who ever shouldered musket did not have the facilities for manufacturing arms or ammunition, or for weaving even their blankets. They had no arsenals or workshops, no factories, nothing of the sort by which they could supply any of their necessities. And this was Mr. Jefferson Davis' ideal of an independent nation. Canada has pursued a different policy, but this is what the *Globe* desires to destroy.

What Canada needs at this time is protection to its own industries. Our present tariff does not afford this protection. The iron and steel clauses of the McKinley tariff would suit us admirably. Give us these and we will soon produce what we require of these articles: and we will then be independent of the outside world as the United States is.

BRITISH TRADE.

THOSE who favor unrestricted reciprocity between Canada and the United States ridicule the idea of the possibility of Great Britain entering into any arrangement with her possessions, by which preference for their products will be shown in the British market. They tell us that the trade of Britain with her dependencies is but a very small portion of her total trade, and that, therefore, she would not do anything to imperil the greater to assist the lesser.

The trade between Britain and her dependencies, wherever they may be, is not foreign trade by any means: it is, properly viewed, internal commerce, quite as much as is the trade between Toronto and Montreal.

Figures before us, having reference to a recent year, show that the imports into Britain from her possessions were as follows: From

Asia	$188,187,000
Australia	124,660,000
America	98,430,000
Africa	32,572,000
Europe	5,140,000
Total imports from British possessions	$448,989,000

The total imports from all foreign countries in the same year amounted to $1,480,540,000, the colonial trade being about 22 per cent. of the whole.

The total exports from Great Britain in that year amounted to $1,443,821,000, of which the following were to British possessions: To

Asia	$192,615,000
Australia	91,057,000
America	58,291,000
Africa	39,458,000
Europe	12,902,000
Total exports to British possessions	$394,323,000

Deduct this from the total exports, and the balance shows the real value of trade with foreign countries. This was $1,049,498,000, the export trade with the colonies being about 25 per cent. of the whole.

The total imports and exports were as follows:

Imports	$1,929,529,000
Exports	1,443,821,000
Total	$3,373,350,000

The total trade with the colonies being :

Imports	$448,989,000
Exports	394,323,000
Total	$843,312,000

The total trade with foreign countries in that year amounted to $2,530,038,000.

It will be observed that the total imports exceeded the total exports $485,708,000. This large amount is compensated by interest on foreign investments, by exchanges on money, and by freights earned in carrying on the traffic, but it is a heavy load to carry.

EDITORIAL NOTES.

PROTECTION increases the value of the lands of the farmer; increases the price of his products; increases his annual income, and gives him a home market in which to sell his goods.

THE farmer's home market is the most available one for his perishable products. It saves cost of transportation; saves the profits of the middlemen, and it keeps the profits of both sides of the trade within the country.

THE only market over which Canada can possibly have any control is the Canadian market. We can control this market by proper legislation, and faithfully maintaining and sustaining the N.P. and the principles of protection.

MEMBERS of the Canadian Manufacturer's Association and all others who may have business with Mr. J. J. Cassidey, Secretary of the Association, will find him at the office of the Association, Room 66, Canada Life building, King Street West.

THE possession of a home market, which can only be had by protection, encourages manufacturing industries near the home of the farmer. It builds up manufacturing centres. It transfers workmen from the farm to the factory. It reduces the number of agricultural producers, and multiplies the number of consumers of agricultural products. It increases the production of manufactured products, and cheapens their price.

THE colony of Sierra Leone is 106 years old, and yet it is said that there is no machinery there except the sewing machine. The population is upwards of 50,000, and not a saw mill or any other kind of a mill is in operation. There is plenty of building material, stone and wood, and as for bricks, if anybody would make them and set them up in the sun they would burn themselves if left alone. It is unnecessary to state that Sierra Leone is an ideal free trade country.

A SYNDICATE of Belgian capitalists have obtained control of what is known as the Atikokan iron range, a vast deposit of most valuable iron ore in Western Ontario on the North Shore of Lake Superior near Port Arthur. The transaction was had through the Belgium Bank. A railway is to be built immediately, connecting the mines with Port Arthur, and a minimum output of 300,000 tons of ore per annum is guaranteed. The proporty is ten miles in length, and it is claimed that the deposits of ore are equal to that of all the mines in the Marquette range. Under the contract blast furnaces and rolling mills are to be erccted at Port Arthur.

THE Blezard nickel mine at Sudbury has been sold to a syndicate of British capitalists for $2,000,000. The plant is to be largely increased and the most modern machinery and appliances introduced. Less than five years ago this property was offered for $25,000 without a purchaser. Machinery was then put in, and before the recent sale enough metal had been sold from the property to recoup the owners for their entire expenditure for property, machinery, buildings, development, etc. If an export duty is imposed upon the nickel contained in the ore and matte Canada will be largely benefitted by the passing of this property into the hands of the British syndicate; otherwise not.

THE writ for an election of a member of the Dominion House of Commons for North Lanark has been issued, and Mr. Bennett Rosamond, of Almonte, has been selected as the candidate of the Conservative party. This is equal to his election. Mr. Rosamond was president of the Canadian Manufacturers' Association last year, which important and honorable position he filled with credit and honor to himself and with the utmost satisfaction to the Association. We take this early opportunity to congratulate the Dominion Government on the accession to its list of Parliamentary supporters of this able gentleman. Always a most ardent supporter of the National Policy, Mr. Rosamond will, from his place in the House of Commons, look well that the manufacturing interests of Canada snffer no injury at the hands of the enemy.

ENGLAND is waking up to the fact that something must be done to check wholesale immigration to her shores. She sends us at the same time 1,600 immigrants in three months, of whom the most we can say is that they are probably the best we get, and would be welcome if they came alone. Ireland sends us 30,000 in the same time, many of whom are not so desirable. In all, we got from Europe, during the three months ending June 30, 1891, 235,000 immigrants.—*St. Louis Farm Machinery.*

The fact that England must awaken to is that some form of protection must be adopted if this constant emigration of her working people must be restrained. Thousands of her best farming lands are being converted into sheep pastures every year; thousands of her agricultural laborers, finding their occupation in the country gone, seek their living in the manufacturing cities; thousands of the bone and sinew of the country, finding no employment anywhere in the old land, seek it in new places. Free traders may scoff at England ever again adopting any form of protection, but the new policy of Fair Trade is fast acquiring a popularity there which will soon make it a power in the land.

MR. CRISP, of Georgia has beeen elected Speaker of the United States House of Representatives. Mr. Crisp is a tariff reform Democrat, but he defeated Mr. Mills, of Texas, for that high office, who is also a tariff reform Democrat. Mr. Mills entertained but one idea—the reduction of the tariff—subordin-

ating all other issues to this. Mr. Crisp is a man of two ideas —his chief hobby being the free and unlimited coinage of silver dollars. On this issue the man is a monomaniac. "Whom the gods destroy they first make mad." The average Democrat may always be depended upon to put his foot in his mouth every time he opens it. Mr. Mills might have carried his party to power in the next presidential election with the help of disaffected Republicans. Mr. Crisp will drive all Democratic advocates for honest money to at least refrain from voting, thereby giving the election to the Republican candidate. A Bourbon Democrat, like a Canadian Grit, never learns and never forgets.

Our contention has always been that the Canadian duty upon pig iron is not high enough: that if it was made considerably higher than it now is, we would soon be able to manufacture all the pig iron we require. The following figures will illustrate our argument. In it they show the production of the article in Great Britain under free trade, and in the United States under protection, for a series of recent years:

	Great Britain. Tons.	United States. Tons.
1882	8,586,680	4,623,323
1885	7,415,469	4,044,526
1896	7,009,754	5,683,329
1887	7,359,518	6,417,148
1888	7,998,969	6,489,738
1889	8,522,824	7,603,642
1890	8,001,000	9,202,703

In 1890 the production of finished iron in Great Britain amounted to 1,854,000 tons, and in the United States 2,558,000 tons. Of course protection did it; and if it did it for the United States it will do it for Canada. Free trade sophistry cannot obliterate this fact.

Hon. George E. Foster, Minister of Finance, in his admirable speech at Perth, said: "They talk about taxation, but they leave entirely out of view in their unrestricted reciprocity scheme when they come to you with it, the other side of taxation. Take away all limits and barriers to trade between ourselves and the United States and what is the meaning? In plain English it is that you strike a fatal blow at the labor of the country. Further than that, you take off at one swoop $18,000,000 of your revenue, and there is no way under heaven or among men in this country whereby you can get that deficit made up to you except by coming down to each individual elector and gathering the direct taxation from his pocket. They leave that out. They ask us to enter into an agreement with a country, one of the fundamental conditions being that we shall discriminate in their favor against every other country in the world, and thereby raise a protective tariff of about 50 per cent. on manufactured goods ull round this country and the United States. Thus, while cutting off ourselves from contact and from the life-blood of commerce of the world, making all our channels of intercourse and trade run directly and solely between these two countries, let me ask you what would be our position? Suppose we made a treaty of that kind for five or ten years, and suppose it had been running for that time and all outside communications had been cut off and the channels of commerce dried up in other directions and turned entirely between these two countries; suppose the greater country, the United States, imposes some conditions which would be prejudicial to us where should we be? We would have to refuse it or agree to it. If we refused it the price would be the rupture of these relations and the restoration of the tariff. Then where would we be with our commerce, with our industries, and in our condition of isolation from the rest of the world? It would produce such a cataclysm of business and industry that we should be no longer free. We would have to submit to whatever conditions were imposed upon us by the other country."

Before the new tariff law went into operation the Hawaiian Islands had the privilege of free entry of their sugar to this country, and under the influence of this advantageous arrangement unprecedented prosperity came to the people. The treaty conferred small benefits upon us, for sugar was no cheaper than before in the California market, and we sacrificed about two million dollars a year in custom receipt by making the Hawaiian sugar free. The solitary gain to us, if it were a gain, appeared in the fact that relations were established between the two countries which forbade England to exert undue influence in Hawaii. The general admission of sugar free of duty, under the McKinley act, and the giving of a bounty to American growers, deprived the Hawaiians of all the advantages possessed by them under the treaty. Special provision would have been made for them had it not been that another treaty, negotiated between the governments, giving the United States a kind of protectorate over the islands, was defeated by British influences exerted through a Canadian member of the Hawaiian cabinet. Meddling as usual with the affairs of other people with which they have no right to meddle, the English simply brought about a condition of affairs which threatens the sugar interests of the islands with bankruptcy. Commissioners from Hawaii are now in Washington endeavoring to regain for their country that which has been lost by the insolent interference of England with their relations with this country. There can be no doubt that the disposition at Washington is to deal in a liberal manner with the subject; but the basis of all negotiation must be the complete exclusion of British influence from the government of the islands. This nation will never consent that any European power shall obtain a foothold in that important part of the Pacific ocean.—*Philadelphia Manufacturer.*

Did you ever? According to this the object of the Hawaiian treaty was not to benefit trade, but to forbid England to exert her influence in those the Sandwich Islands, and to give the United States a protectorate over them. It is indeed refreshing to hear this American journal speaking of England as "meddling with the affairs of other people." The American protectorate has not yet been established over Hawaii and if England sees proper to "meddle" in the affairs of that country, "exerted through a Canadian member of the Hawaiian cabinet," what is Uncle Sam going to do about it? England is not in the habit of asking permission of the United States to negotiate with any country, and it is late in the day for the United States to attempt to restrain her in so doing. If England should obtain a foothold in that important part of the Pacific Ocean how would the United States oust her from it?

Prof. Robertson, the Dairy Commissioner, has procured the shipment to England of thirty New Brunswick cheese, mostly from Carleton County. He believes the cheese of the Province is of fine quality, and desires to encourage its export, which it has not yet attempted. The boxes will be labelled New Brunswick cheese and placed in the British market.

AMONG the papers in *Littell's Living Age* for Nov. 7th and 14th are 'Ernest Daudet on Coblentz and the Emigration," *National Review;* "The Spanish Story of the Armada," *Longman's Magazine;* "An Old Greek Explorer of Britain and the Teutonic North, *Fortnightly Review;* "The Troubles of an Oxford Beauty," *Gentleman's Magazine;* "Social Bath in the Last Century, Part IV.," *Murray's Magazine;* "Advertising in China," *Cornhill Magazine;* and "The Schoolmaster: His Griefs and his Joys," *Daily News.* Littell & Co., Boston.

THE *Dominion Illustrated* announces an important departure and one that will mark a new era in the high class journalism of Canada. The publishers of that splendid weekly have decided to convert it into a monthly with the beginning of the year. It will be a 64-page magazine, differing in shape from the present one, handsomely illustrated throughout, and its pages will be graced with the writings of the most gifted Canadian authors. It will be called *The Dominion Illustrated Monthly*, and the subscription, $1.50 per annum, will place it within the reach of all. Address the Sabiston Litho. & Pub. Co., Montreal.

HAPPINESS often consists in reading a good paper, one that leaves a pleasant taste in the mouth, one that you can rise up from perusing with the knowledge that you have gained something of permanent advantage. There are papers which do not give this happiness, but which, while exciting for the moment, result in permanent evil, although the immediate effect at the moment may not be apparent. The Montreal *Witness* is a paper of the former class. It is good; it does good. The weekly edition is sent to subscribers for one dollar a year, the daily for three dollars, and the *Northern Messenger*, a paper for the younger members of the family particularly, and for Sunday-schools, for thirty cents a year.

Good Housekeeping for December is a Christmas number; but in being this it does not neglect the other interests of the home life, and its pages will be found well filled with good things, rich in variety, admirable in tone, and freighted with desirable information. Among these may be named "Little Lord Naughtyboy," a society paper on "Afternoon Receptions," "Our Sleeping-Rooms," "The Attic and its Treasures," "A Chapter on Children," especially relating to "The Baby," with others of equal importance. A most appropriate holiday gift for any housewife—or for almost anybody else—would be a year's subscription to this model home magazine. Clark W. Bryan & Co., Springfield, Mass.

THE *Illustrated American* this week teems with newsy articles. Its main feature is an admirably written story of the attempt to blow up Mr. Russel Sage by dynamite, in New York, a few days ago. The article is illustrated by photographs of the disaster showing both interior and exterior of building and offices. Two pages are devoted to the St Louis Jubilee in honor of Archbishop Kenrick, accompanied with a portrait of that venerable gentleman. The launch of the new and so far most formidable of American warships, the *New York*, illustrated throughout with instantaneous photographs of incidents of the launch, makes another interesting story. The pretty face of Miss Mattie Mitchell, the future Duchesse de la Rouchefoucauld, looks out upon you as the frontispiece, and the Beauty of By-gone Days for this week is Queen Henrietta Maria of England. The theatre is represented by "The Lost Paradise," and Adelaide Arthur is in this number the footlight beauty. The short story this week is "Two Silly Old Fools."

THE *Popular Science Monthly* is rapidly coming to the front as an illustrated magazine. Until recently it published only a few simple drawings, where they were specially needed to supplement the text, but the January number is to have no less than sixty illustrations. Those in the article on "American Pottery" are specially noteworthy, and the other illustrated articles are "Remarkable Bowlders," "Tail-like Formations in Men," "The Aviator Flying Machine," and "The Musk Ox." The frontispiece is a portrait of Prof. Elias Loomis. The kinship which Darwinism recognizes between man and the brutes is strongly confirmed by the facts contained in an article on "Tail-like Formations in Men," to appear in this magazine. The researches of several German physiologists are here presented, and pictures of a number of these strange formations are given. "Theology and Political Economy" is the subject of Dr. Andrew D. White's next chapter in his "Warfare of Science" series. Paying for the use of money is the matter in which the Church has most seriously obstructed commerce, and a full history of the conflict over interest is given in this article. It will be published in the *Monthly* for January. An illustrated sketch of certain "Remarkable Bowlders," by Mr. David A. Wells, is also to appear. These immense stones, weighing thousands of tons and found hundreds of miles from their places of origin, give striking testimony to the mighty power of glacial action. Mr. Carroll D. Wright will have an interesting study of "Population and its Distribution in the United States," showing the movement of the centre of population westward, and how the people are distributed with repect to topographical features of the country, rainfall, humidity, etc. All interested in the teaching of young children will be glad to read Mrs. Mary Alling Aber's account of "An Experiment in Education." It is a sample of the sporadic efforts to introduce little children to real knowledge, which promises valuable results in the near future.

PRETTY "Mamie" Dickens was already considered by those who knew Charles Dickens best to be the novelist's favorite daughter. To none of his children, perhaps, was Dickens more affectionately attached, and the "pet daughter" saw much of her father under all circumstances. When even the dogs were chased out of the novelist's study, Mamie was allowed to stay. The daughter is now a full-grown woman, living quietly just outside of London. For the first time since her father's death, Miss Dickens has been persuaded to write of him whom she knew so well. During 1892 there will be published in *The Ladies' Home Journal*, of Philadelphia, a series of articles by Miss Dickens under the attractive title of "My Father as I Recall Him." Fortunately for the thousands who will read what she writes in this series, Miss Dickens has a retentive memory, and she made copious notes during her father's lifetime. She will tell in this series everything she remembers of her father; how he educated his children; his family life and his personal habits; how he wrote his famous books; his love of flowers and animals; how Christmas was spent in the Dickens household; how the novelist romped with his children; the famous people who came to the Dickens home, and his last years and closing days. No articles ever published have in them so much promise of telling the world things which it has never known of Dickens, and Miss Dickens' story of her father's life will be eagerly looked for in thousands of homes where the name of Dickens is like a household word.

THE Christmas *Wide Awake* is as gay as old Santa Claus himself, and it is a big pack of holiday delights. Its exquisite frontispiece, in color, is from the terra-cotta bas-relief "Day and Night" by Caroline Hunt Rimmer, daughter of Dr. Rimmer the late famous Art-Anatomist. Rarely has anything more beautiful been given in a magazine. Perhaps the story that will attract the most attention is the first one of the "Fair Harvard" series, "Such Stuff as Dreams are made of," by John Mead Howells, the son of W. D. Howells, a good proof that there is something in heredity. The opening story is as delicious and fresh: "How Christmas came in the Little Black Tent," by Mrs. Charlotte M. Vaile, with two illustrations by Irving R. Wiles. "Christmas with 'Ole Sherman'" is an incident of the war, from the rebel standpoint, in which General Sherman figures genially. In her story "The Fairy 'Content,'" Mrs. Jessie Benton Fremont is at her brightest and best. "Queen Margaret's Needles," by Susan Coolidge, is an historical ballad of Norway. Another fine ballad is "The Fourth Little Boy," by Mary E. Wilkins, with seven pictures by Childe Hassam. Still another is "Santa's Reproof," by Emilie Poulsson. "The War of the Schools," by Capt. C. A. Curtis, U.S.A., is a splendid snow-balling story. "Captain Joe" is a particularly bright and fresh war story by a new Southern writer, Helen Keene. "In Arctic Pack-Ice" is a thrilling story by Lieut-Col. Thorndyke, the first in the series of "One Man's Adventures." The illustrated papers are interesting: "A Roumanian Princess," by Eleanor Lewis, and "How I became a Seneca Indian," by Mrs. Harriet Maxwell Converse. The serials open well: "Jack Brereton's Three Months' Service," a war story by Mrs. Maria McIntosh Cox, "The Lance of Kanana," a historical Arabian story by Abd el Ardavan, "The Writings-Down of Dorothy Holcomb," some quaint New England village work. There are the departments, "Men and Things," Tangles, and Post-Office, besides many bright pictures and poems—among the latter a particularly noticeable one, "The Bad Little Coo-Bird," by Charlotte Perkins Stetson. *Wide Awake* is $2.40 a year. D. Lothrop Company, Boston.

"THE weakest part of a boiler," says the *Marine Engineer*, London, "is that where the plates are joined and riveted, and whatever the thickness or quality of plate, the joint between one plate and another is the test of its strength." Mr. John Windle, of Barrow-in-Furness, took out a patent for a mill to produce these plates, and a plant will soon be erected to manufacture ring boiler plates or shells. It is proposed to make the ring plates from twelve to sixteen feet diameter and five feet wide. The rings will have flanged ends and can easily be turned so as to make accurate fittings. It is claimed that boilers made from the new plates will stand 250 to 300 pounds pressure.

EX-CONGRESSMAN NIEDRINGHAUS, of St. Louis, points out that prices on galvanized iron now are only about half of what they were when this material was imported free, or nearly free of duty, from England years ago, while the manufacturers pay two and a half times the English price for rolling the iron.

THE intimate trade relations which exist between the United States and Mexico are strikingly emphasized by the report of the trade of Mexico for the past year, which has just been issued by President Diaz. The foreign trade for the fiscal year of 1890-91 amounted roundly to $63,300,000, and of this nearly $45,000,000 was with the United States. England stands next with about $11,000,000 to its credit, and France follows with $3,000,000. Compared with 1889 90, the United States gained nearly $2,000,000, and Great Britain fell off $3,000,000.

ELECTRIC transit has several capital advantages over all other forms of passenger transportation, says the Reading *Herald*. (1) It is the least costly. (2) It gives sufficient rapidity of movement, only modified by conditions of safety. (3) It does not seriously interfere either with the surface ways or the subways along the line of its location. (4) As compared with horse traction it has great sanitary advantages. (5) It may be so applied as to propel the cars and at the same time light and heat them. (6) The streets may be beautifully and cheaply lighted by the same electric plant. The twin cities of the west—Minneapolis and St. Paul—have no horse cars. Their system of electric street railways cover 230 miles of single track, and the passenger street traffic is carried on with a precision, rapidity, comfort and convenience that are surprising. "Imagine," says the Philadelphia *Record*, "a street with double tracks for passenger railway service, asphalted at the sides for horse traffic, with a wire strung overhead in the centre to answer the double purpose of tractive power and for lighting the thoroughfare. This arrangement is the high-water mark for comfort, convenience and business utility which invention has as yet failed to improve upon, and which Philadelphia has as yet failed to seize upon."—*Montreal Herald.*

MR. I. M. WESTON, President of the Michigan World's Fair Board, writes to Chief Buchanan asking for a large space in the Forestry Building. He says Professor Beal of the Michigan State Agricultural College, will make an exhibit in the Forestry Building, of laths, shingles, paper pulp, and lumbermen's tools. In addition to Professor Beal's exhibit, Mr. Weston says he will make an exhibit of the methods of lumbering—logging, logging railway trains, trucks, sleighs, pictures etc.— and will show two sections of logs to be cut this winter. He says he has issued circulars to the lumbermen of the state to save such sections. It is his intention to make the features of the Michigan exhibit forestry, fruit, fish, and minerals. A committee of fifteen lumbermen has been appointed, all of them millionaires and all of them taking great interest in the work. Professor Beal will spend about $50,000 in collecting specimens of the seventy varieties of trees in Michigan and the several hundred varieties of what the professor calls shrubs—that is, trees under six inches in diameter. The specimens of the standard trees which he will collect will be eight feet long. Professor Beal had charge of the Philadelphia lumber exhibit, which was burned. He is the best authority on trees and grasses in Michigan and perhaps in the country, his work on grasses being a recognized standard authority.

IN these days when lamps are used so much the care of them is quite an important matter, writes Maria Parloa, in her department in the *Ladies' Home Journal*. If the lamps be good and have proper attention one cannot wish for a more satisfactory light; but if badly cared for they will be a source of much discomfort. The great secret of having lamps in good working order is to keep them clean and to use good oil. Have a regular place and time for trimming the lamps. Put a folded newspaper on the table, so that any stray bits of burned wick and drops of oil may fall upon it. Wash and wipe the chimneys and shades. Now take off all loose parts of the burner, washing them in hot soap-suds and wiping with a clean soft cloth. Trim the wicks and turn them quite low. With a soft, wet cloth, well soaped, wipe the burner thoroughly, working the cloth as much as possible inside the burner, to get off every particle of the charred wick. Now fill the lamps within about one inch of the top, and wipe with a damp towel and then a dry one. Adjust all the parts and return them to their proper places. Whenever a new wick is required in a lamp, wash and scald the burner before putting in the wick. With a student lamp, the receptacle for waste oil, which is screwed on the bottom of the burner, should be taken off at least once a week and washed. Sometimes a wick will get very dark and dirty before it is half consumed. It is not economy to try to burn it; replace it with a fresh one. The trouble and expense are slight and the increase in clearness and brilliancy will repay the extra care. When a lamp is lighted it should not at once be turned up to the full height; wait until the chimney is heated. Beautiful shades are often cracked or broken by having the hot chimneys rest against them. Now, when lighting a lamp be careful that the chimney is set perfectly straight and does not touch the shade at any point. The shade should be placed on the lamp as soon as it is lighted, that it may heat gradually.

THE trouble with the eight hour plan, is, in the fact that so many men who cannot get a descent living on eight hours of labor are taught that they can earn as much in that time as in twelve hours, and are made to believe it, or else denounced as scabs and nobodies. If the laborer attempts to work more hours, he is called an enemy of workingmen, an enemy of progress, and so on, until he is forced to a life of partial idleness, while his children are suffering for comforts which his labor could furnish without injury to himself or to any mortal in the world. There are hosts of men somewhat deficient in skill who could partially make up in longer hours their lack of efficiency were they permitted to, but as they are not, they are forced to live on the verge of beggery all their days, and are taught to curse society for not giving them a better chance in the world. How many such there are in this country God only knows, but that they are numerous there can be no doubt. The evil is prodigious, and is not confined to this class entirely. Others are affected in an unfavorable way. The idea is encouraged that labor is an evil to be shunned like vice, and that there is a way to enjoy the fruits of labor without its exercise. The consequence of the prevalence of this idea is, that men are led to hope for the impossible, to trust in its coming, and to neglect the golden opportunities for making their way which lie directly before them. The man who thinks he is getting richer by three or four hours of idleness every day is not likely to set much value on time, and when he does not do that he tends to unthriftiness, and in time will become a good deal of an idler if not a downright loafer. When the whole community becomes thus affected, the consequences will be serious. They are serious already.—*The Popular Science Monthly.*

CANADIAN ANTHRACITE.

A CHANGE in the parties who operate the anthracite coal property at Anthracite in the territory of Alberta, has resulted in a change of development tactics in that property. The old company operated by means of a tunnel about 300 foot above water level, cutting the veins of coal, throwing out gangways to the right and left, three seams being worked on each side of the tunnel. Now we learn that the H. W. McNeill Company, Limited, which began work last June as lessees from the Canadian Anthracite Coal Company, has sunk a slope to the depth of 380 feet below water level, and is driving a tunnel to connect the same veins. The new workers have thrown out gangways and are preparing to operate the new level on a gigantic scale. It is said indeed that by January 1st the product will be 200 to 300 tons per day. What with the old and and the new levels, there is an enormous quantity of coal in sight.

The former company, it seems, did not work economically, having got out too much rock with the coal, and it lost, besides, by handling the soft anthracite of this region as they would the harder coal of Pennsylvania, resulting in too large a proportion of screenings.

The manager of the present operating concern, Mr. H. W. McNeill, a coal mining expert, used to be manager of the Oregon Improvement Company, and is well known to Mr. Van Horne. He has introduced labor-saving appliances, reducing to the lowest the cost of production, breaking, screening and loading. The Calgary *Herald* says that the operating plant, in fact, is the best that money can buy.

At Canmore an important work of development has been going on. The Canadian Pacific Railway Company are building a branch of over 6,000 feet in length to connect the seams in White Man's Pass with the C.P.R. bridge across the Bow and with the main line. The work is nearly finished. As soon as it is, 150 men will be employed at the Canmore mine getting out steam coal and preparing a supply for the coking ovens which it is proposed to build there.

The value of this deposit of hard coal in the heart of that district is especially great in view of the mining interests within easy reach. Anthracite is only four miles from Banff, and about forty miles from Golden, which is a promising mining camp. At Revelstoke there are two smelters; at Golden, one. Coke is to be made at Canmore on the Canadian Pacific Railway, which is close by. The following figures we take from our contemporary's article: "The deposit at Anthracite and the Canmore property include an area eighteen

miles in length and covering 10,000 acres. It extends from the Gap to the Cascade Mountains and includes some twelve or fourteen seams of anthracite and about twenty-eight seams of the Canmore steam coal." It has been examined by such coal experts as Roland C. Luther, general manager of the Philadelphia and Reading Coal Company; John R. Hoffman, mining engineer, one of the highest authorities on coal mining in the United States, and Ralph C. Moore, of Glasgow, Scotland, who was for long years inspector of coal mines for the British Government in England, Scotland and Wales. These gentlemen made independent reports testifying to the great value of the property, Mr. Moore placing the extent of the deposit at 150,000,000 tons. It is agreeable to learn that the best and most modern plans are being adopted to develop this great element of economic wealth.

FREEZING CARCASES WITH SKINS ON.

AN Australian journal, the Rockhampton *Bulletin*, in a recent issue stated that a meat-shipping concern, the Lake's Creek Company, was experimenting as to whether meat turns out best if skinned before freezing or after, and had sent one quarter of a bullock to London, another to Melbourne, and a third to Mr. Spafford, a local butcher, retaining the other at the works. A sheep had also been forwarded to each place, and one kept at the company's own establishment. The *Bulletin* of a later date adds; "With reference to the paragraph concerning the experiment now being tried by the Lake Creek Meat Company, one difficulty experienced by all engaged in the export of frozen meat has been in thawing the carcases after they have reached the old country. Directly the meat is exposed to the open air the condensation of moisture ensues, and this, running down the meat, gives it a washed appearance, and detracts from its commercial value. Some time ago the idea was conceived that if cattle could be frozen with the hides on, and the sheep with the skins, it would be possible to thaw without in any way injuring the meat, and so far the experiment in that direction has been successful. A few days ago two sheep carcases were placed in the freezing-room at the works, one with the skin attached and the other dressed. Each was subjected to the same treatment, and when they had been thoroughly frozen they were taken out and allowed to thaw. That which had been dressed was fit for cutting up in twelve hours. The other could not be touched for thirty-six hours, and might have been left another four or five hours. When the skin was taken off the latter the flesh had all the appearance of having been freshly killed, while the flesh of the former looked as if it had been washed. The management have every reason to believe the experiment with the meat will be equally satisfactory. If carcases can be sent to London in this way one great difficulty in the way of the successful conduct of the frozen-meat trade will be overcome; but the hides and skins will have to be shipped as frozen meat as well as the beef and mutton, and freight paid on them at the same rate, thus increasing greatly the cost of transmission to market."

PETROLEUM AS FUEL IN LOWELL.

ACCOUNTS from Lowell state that the Tremont and Suffolk mills, Lowell, Mass., have made a practical success in using petroleum as fuel, and the estimate is made that a pound of the petroleum is equal to eighteen pounds of coal. The mill uses the petroleum in the form of gas. The plant includes two tanks, which are buried in the ground about thirty feet from the furnaces, thus insuring safety from fire. A smaller tank is located above the larger ones and the contents of the latter are pumped into it. This small tank contains the supply for immediate consumption. A series of pipes runs from here to the boilers, which are situated on a lower level.

The arrangement of the oil reservoir in relation to the boilers is perfectly safe. The level of the two larger tanks is below that of the boilers, so in case the regulators fail to act and cause the tanks to burst, no serious results would follow so far as fire is concerned. The upper tank is so small that its contents would soak into the ground before they reached the boilers.

The oil flows from this reservoir through the pipes to the burners under the boilers. These devices consume the oil in the form of spray mixed with steam. Perfect combustion is produced and no soot or smoke is caused, yet volumes of black smoke pour out of the chimneys surrounding the Tremont and Suffolk mills, while not the slightest trace of smoke can be seen issuing from its own. The fire is regulated by simply turning a valve, thus it is under the immediate control of the firemen, and it is an easy matter to keep the steam at a uniform point. The mills used eight boilers before they introducted petroleum. To-day they are using but six, and yet the speed of the two powerful engines is the same, and have just as much work to do as before. The neatness of the fire-room in consequence of there being no coal or ashes is an important point. The experiment has not been under way long enough to permit an estimation of the difference between the cost of oil and coal as fuel, but it is supposed the difference is small. The oil is brought to the mills in tank cars containing from 3,500 to 6,000 gallons each.—*Heat, Light and Power.*

ORE IN NEW BRUNSWICK.

PROF. L. W. BAILEY, of the Geological Survey of Canada, states that all the usual ores of iron occur to some extent in New Brunswick, including hematite, limonite, siderite or spathic iron, and magnetite, though none are now employed as a source of the metal. By far the largest deposits are those of hematite, or mixed hematite and limonite, which form extensive beds near Jackstown, north of Woodstock, in Carleton county. They may be traced across the greater part of this county in parallel and closely associated bands, and vary from two or three to fifteen feet in thickness. Somewhat extensive operations were at one time (1848-1865) carried on near Woodstock in the smelting of ore, and a charcoal iron manufactured, which, for certain purposes, was highly esteemed. This was no doubt due to the fact of the ore naturally containing a considerable percentage (1.6 per cent.) of manganese, there by adding materially to its tensile strength. It was, however, on the other hand, also contaminated with a considerable amount of phosphorus (one analysis yielding 1.298 per cent. of phosphoric acid), and, therefore, apt to be cold short in a high degree.

NEW ENGLAND'S COAL SUPPLY.

THE price of coal is a serious question to New England manufacturers. These states consume annually about 11,000,000 tons, of which only a very small fraction is produced in New England. Massachusetts and Rhode Island contain a few small deposits, but the heavy cost of obtaining it places it beyond the reach of consumers. The census of Massachusetts shows that the cost of fuel used in her manufacturing is equal to 2 per cent. of the total cost of all the material used in the woolen manufacture, to 1.7 per cent. of the total cost in the worsted manufacture, to 3.2 per cent. of the total cost in the cotton manufacture, and to 1½ per cent of the total cost in all industries.

This coal is chiefly supplied by the mines in this country and in Nova Scotia and New Brunswick. The larger part is American coal, and but a small per cent. Canadian. The following were the imports of Nova Scotia and New Brunswick coal for six years:

	Tons.	Value.
1885	61,505	$61,258
1886	76,575	96,900
1887	45,935	44,235
1888	65,368	73,825
1889	28,510	21,810
1890	36,317	34,405

There has always been a duty on bituminous coal, but the duty on anthracite coal was removed in 1870. Between 1846 and 1861 the duties were *ad valorem*. Now they are in part specific and in part *ad valorem*. The present duty on bituminous coal and shale is 75 cents per ton on screenings, slack and culm 30 cents per ton, and on coke 20 per cent. *ad valorem*. These rates are the same as those of the tariff of 1883 and of the Mills Bill. They are lower than the duties imposed previous to 1883, with the exception of the tariff of 1846.

The coal area of this country is estimated at 192,000 square miles, of which 120,000 square miles can be profitably worked at present. Nova Scotia has a coal area of 18,000 square miles, Great Britain 11,900 square miles, and Russia 30,000 square miles. Our coal area is over three times larger than the rest of the world combined. It is said that West Virginia alone contains more coal than all the English mines combined. The anthracite coal area is confined mainly to the Wyoming, Lehigh and Schuylkill regions of Pennsylvania, though it is found in a limited extent in Virginia. About eight-ninths of our imports of coal are brought from British Columbia and Australia, but the rapid development of our western mines is steadily reducing the necessity for these imports. The following

shows the production, in tons, of coal in this country for each census year since 1850:

	Anthracite.	Bituminous.
1850	.....	7,173,750
1860	9,398,332	5,775,077
1870	15,664,275	17,199,415
1880	28,649,872	42,776,624
1890	45,544,970	94,495,000

The output of England in 1888 is estimated at 169,935,219 tons, so that the United States is now the second largest producer, and at its present rate of increase will soon stand first.—*Bradstreets.*

REMARKABLE MAGNETIC ORE.

ABOUT half a mile below the lower fall of the Kootanic River, British Columbia, on the north bank and near the water's edge, is a remarkable occurrence of magnetic iron ore. The ore is found in large, loose masses, weighing several tons, but owing to the want of good exposure, its actual relations to the rocks adjacent could not be ascertained. The place of its occurrence is near, if not on, the line of junction of the granites with the here highly altered rocks of the stratified series. It appears to be associated with a dyke about forty feet in width, of green-gray augite—porphyrite of somewhat peculiar appearance, which crumbles down easily under the action of the weather. It seems probable that the iron ore, which in situ may form large, irregular masses along the borders of this dyke. The ore is finely granular in texture, and generally free from rock matter or other impurities, but in some places contains silicious kernels, with epidote and brown garnet. A fragment of the ore, comprising one of these kernels and rusty in appearance, was examined for gold and silver, but proved to contain neither.

STREET SURFACE RAILWAYS.

JOHN N. BERKLEY, in a report to the American Street Railway Association, refers as follows to the growth of the industry represented :—

Five years ago the only street surface railways which were in successful operation anywhere in the United States were horse and cable railways. Within that five years more than 4,000 street cars have been electrically equipped, and to-day more than 3,000 miles of track in 300 cities and towns of this country have been constructed, on which these electric cars are run with satisfaction to the people, and, in the main, with profit to the companies operating them.

The development of the street railway has had as much to do with the growth and prosperity of the towns and cities of this country as, or, perhaps, more than, any other one thing. The transportation of people by street railroads is most intimately connected with the social and business life of the people. Nearly 500 cities in the United States have street railway systems in operation. More than 800 corporations are operating street railways in such towns and cities. As many as 30,000 street cars, horse, cable and electric, are to-day running upon the 8,000 miles of street railroads in this country. In these cars, and on these tracks, are carried 3,000,000,000 of people yearly, or fifty times the entire population of the United States. When we consider that the number of people carried by all of the steam railroad companies in all of the States of this Union last year is estimated at less than 500,000,000, and that more people are carried on the street surface railroads in the City of New York in a year than are carried by all the steam railroads of the State in the same period, we come to have some conception of the immense importance to the people of the rapid, efficient and safe service of street cars in the rapidly growing cities and towns of this wonderfully prosperous country. Think for a moment of the daily loss to the people of any city where horse cars are run at from four to six miles an hour, as compared with the operation in the same city of electric or cable cars running from six to twelve miles an hour. Consider the immense increase in the value of property in our municipality caused by the introduction of rapid transit. Consider the wholesome influence upon the people of every community, where the husband, or other head of a household, is able, by means of facilities of quick transportation, to take his mid-day meal with the members of his family. The best thought of this time may be well expended upon this great question of furnishing quick, safe, cheap and comfortable transportation to the people whose lot it is to dwell, as dwell they do in such vast numbers, in the towns and cities of this land.

BELGIANS SECURING IRON ORE LANDS.

A BELGIAN syndicate has secured the right to explore a large tract of mineral lands on the north shore of Lake Superior, with the privilege of leasing the same for mining purposes if they should prove rich in mineral. The lands are owned by capitalists of Superior, Wis. M. Macquet, a civil engineer of Brussels, and the agent of the Societe General pour favorisier l'Industre Nationale, a banking and investment concern under the control of the Belgian Government, which was the real lessee of the mines in question, secured the option for his principals on the basis of a royalty of 40 cents per ton, after the United States duty of 75 cents per ton on Canadian iron shall be removed, and 25 cents per ton until that time. The options run until November 1, 1893, for the purpose of making explorations, and one year thereafter will be allowed in which to build the necessary fifty miles of railway, if the Belgians conclude to confirm the lease. The option also covers one-sixth of the fee at a price in cash to be agreed upon by appraisal, if the lease shall be confirmed. The leases have been drawn in duplicate and copies forwarded to Belgium to be approved and signed. The property leased lies on the Stiko-Kan River, and is said to be practically a solid mountain of anti-titanic magnetic ore, running 69 per cent. of metallic iron.

STAVELESS BARRELS.

IT is doubtless a matter of general knowledge that the bodies of casks and barrels are composed of a number of tapered staves, which are assembled together, held in position and hooped up. By a novel and ingenious method of manufacture casks are now being manufactured from one piece of wood, and therefore without any staves, or, it may be said, with only one, the body constituting in itself a long, single stave. The method of preparing the body of the cask may be likened to the sharpening of a lead pencil by a pocket sharpener. The stem of the tree is first cut up into pieces or logs of a length according to that of the barrel required, and is then boiled for two or three hours in a closed vessel to soften the wood, a current of electricity being passed through the water the whole time. From the boiler the log of wood is taken to the machine, where it is held at each end horizontally between two points, much in the same way as a piece of wood is held in the lathe. Rotation is given to the piece of timber, which is advanced towards a broad blade fixed on a frame having a slot in it in a line with the edge of the blade, just as in a plane, which the cutting part of the machine may be said to resemble. As the trunk of the tree is revolved against the blade a continuous sheet of wood is produced of any desired thickness. The wood is drawn out flat from the rear of the machine by hand onto a table. The sheet of wood thus obtained is cut transversley into pieces each of the required length for one barrel. The pieces are then passed through a grooving machine, which cuts the groove in which the head is eventually fitted. Another machine cuts V shaped pieces at intervals out of the edges of the pieces of wood, which are then easily bent round into a cylinder and firmly hooped, the V shaped slots enabling it to assume the necessary conical form at each end. There is thus only one joint in the body of the cask or barrel. The casks are afterwards dried in a special apparatus, after which they are ready for use. A factory is in operation in Germany manufacturing these casks, some of which we recently examined at the offices of the Oncken Patents Syndicate, 10 Old Jewry Chambers, London. We were also shown a model of the machine and some samples of wood of various thicknesses, including some exceedingly thin veneers.—*London Times.*

RECENT ENGINEERING TRIUMPHS.

SOME facts brought out in an address by the new president of the British Institution of Civil Engineers, Mr. George Berkley, regarding recent advances in engineering, are worthy consideration and congratulation. In paragraphic form we note a few of the striking statements adduced :

The introduction of the electric light on the Suez Canal has reduced the time of passage from 38 hours to 22½ hours and has increased the carrying capacity of the canal, 2,832 vessels having passed through the canal at night in 1890.

The rapid advance in the introduction of metal railway ties is shown by the fact that, on the Great Indian Peninsular Railway there are now 2,600,000 pairs of cast iron sleepers, only 840,000 wooden ones remaining on the track, and experience has suggested

that the metal sleepers will last sixty years or six times as long as the wooden ones.

In the science of iron-making, while a few years ago the United States did not produce annually one-forth as much iron as Great Britain, the American produce now exceeds that of Britain by 2,000,000 tons annually. In blast furnace practice Americans are far ahead. In Great Britain the output of one stack does not appear to exceed 750 tons per week, while in the United States in some cases 2,000 tons have been run from one furnace in a week.

The progress in telegraphy, telephony, electric light, etc., is shown from the fact, that by the multiplex system of working six messages can now be sent along a single wire instantaneously in each direction. The length of conducting wires laid in England for public telegraphic purposes is 174,633 miles, and the number of instruments is 13,740. In London 5,750,000 messages, and in Great Britain 66,500,000 messages were received in 1890. Speech had been maintained with perfect clearness by telephone between London and Paris, a distance of 311 miles. There are about 48,600 miles of submarine cable now in use.

The advances made in sanitary engineering are, perhaps, best shown by the statement that, owing to improved drainage in London, the death rate has decreased from a mean of 24 8 per 1,000, during the decade ended 1850, to 22.5 in that ended in 1880, and to 21.4 in 1882, while during the past eight years in has averaged 19.52 per 1,000.

The list might be indefinitely added to, but the above indicates the rapidity with which the world is moving forward.—*Iron Trade Review.*

UNION TRADE MARKS.

THE Supreme Court of Pennsylvania last week handed down a decision, which has brought out considerable comment and denunciation from trade unionists. This was in reference to trades union ownership of trade marks. A branch of the Cigarmakers' International Union, in Lancaster county, by bill in equity restrained a cigar manufacturer from using the union label on his goods. The manufacturer then proceeded to issue a similar trade mark and appealed to the Supreme Court. Judge Williams reversed the decision of the lower court. He held that the Cigarmakers' Union, formed for the "mental, moral and physical welfare of its members," is a personal and social organization, not a commercial one, and so, under the law of Congress, cannot own a trademark. In his decision Judge Williams very clearly outlines the object of trade unions in adopting labels. He says of the case in point:

"This is an attempt to use the public as a means of coercion, in order to find a market for their goods or labor. A first-class workman is one who does first-class work, whether his name is on the rolls of any given society or not. Filthiness and criminality of character depend on conduct, not of membership of the union. Legitimate competition rests on superiority of workmanship and business methods, not on the use of vulgar epithets and personal denunciations. The International Union in this case has an avowed purpose to do harm to non-union men; to cover them with opprobrium, and they ask a Court of Equity to say they have a right to do it. We decline to say so."

The sentiments quoted above have been denounced by the labor press, and the decision itself has been termed an invasion of the right of trade unions. To the unprejudiced observer, however, it is plain that labor organizations in their rules regarding trade marks and labels, often show a decided disposition to invade the rights of others in the same line. In the case mentioned, the union declared that all goods not bearing its label were of inferior workmanship. This was plainly unjust to the workers not in the union, and brought forth the straight and strong statement made by Judge Williams. If a trade union wished to place some distinguishing mark upon goods made by its members the right to do so is unquestioned, but when that mark is used as a means of stigmatizing all workmen outside of the union lines, the law calls a halt.—*American Manufacturer.*

CONTINUOUS RAILWAY BRAKES.

A RETURN on the subject of Continuous Brakes furnishes in satisfactory evidence that the time is rapidly approaching when the only effective mode of readily stoppinga train will be use all over the United Kingdom. The act for the Regulation of Railways passed in 1889 rescued the Board of Trade from the undignified position of continually recommending without the power of enforcing. The continuous brake is now becoming obligatory, and at the close of last June was in use, in its most approved form—of which there are nominally three varieties, but practically only wo—on eighty-six per cent. of the vehicles running in passenger trains. Including half a dozen continuous brakes which appear to comply with only some of the conditions laid down by the Board of Trade, the proportion of carriages thus fitted amounts to ninety-six per cent., subject to some deduction for partial fitting. Six years earlier less than half the passenger carriages possessed the approved brake, but it is remarkable that nearly one-third were fitted with a continuous brake of an imperfect description, thus making a total of seventy-nine per cent. The imperfect brake has, therefore, been giving way to the approved type, its present proportion being only ten per cent. Doubtless the least effective of the continuous brakes far excels the old system of a brake in the guard's van. But the weeding out of the isolated brake is to be followed—unless in some few cases of little importance—by the disappearance of all those continuous brakes which fail to comply with the requirements of the Board of Trade. The expense of this change is doubtless considerable, but it carries with it many advantages which may be held to compensate for the outlay. It is obvious that when a train can be kept well in hand the risk of accident is diminished, especially where the traffic is crowded and the speed is high. Even when a mishap occurs—as in the recent case of the Brighton express, at Norwood Junction—the instant application of an effective brake often reduces what might be a colossal disaster to one of comparative insignificance. How promptly a continuous brake can be made to act is shown by some particular cases mentioned in this return. In one instance a driver pulled up within half a yard of a party of children who would infallibly have been run over had the brake been other than one of the best. But to most good things there is some drawback, and there are instances in which continuous brakes have proved troublesome, delay in the working of trains being caused by some defect in the action of the apparatus. This has not always been the direct fault of the brake, but has occasionally been due to neglect or inexperience on the part of the Company's servants. Of the general value of the invention there can be no doubt. It is now fully recognised in England, it is being learned by our Continental neighbors, and it is evidently destined to be universally used.—*London Standard.*

LIGHTNING RODS.

IN the *Electrical World* is an article by Elihu Thomson on the use of lightning rods and how best to arrange them. As the subject is one of vast interest to all, we quote as follows:

The following queries were sent out by one of the metropolitan journals:

Do lightning rods really afford any protection?

What is the nature of the electrical discharge?

What is the correct theory of its cause?

What is the correct theory of the action of lightning rods? Should they be insulated or not?

Does their effectiveness depend on their cross section or surface?

Do you agree with the ideas advanced by Mr. N. D. C. Hodges in his paper on this subject, read before the Institute of Electrical Engineers, April 21st, and reprinted in part in the *Electrical World* of May 2nd.

In regard to the utility of lightning rods I think there can be no question that a properly constructed and arranged lightning rod will afford complete protection of buildings from the effects of lightning discharges. In the first place, in my opinion, the lightning rod, contrary to the opinions put forward and even advocated in the books, does not have any considerable effect in conducting off discharges from the clouds silently, for the reason that the development of the conditions of the discharge from the cloud to the earth is oftentimes too sudden to allow any rod or rods to effect this work of conduction in a silent manner. The cloud ordinarily during thunder storms is moving rapidly and the lightning strokes are found most frequently where the densest rain exists, and it is easy to see that a building may suddenly be drenched with rain and the conditions for a stroke brought about at such a rate that a lightning rod or rods could not ward off a discharge by conducting the electricity silently to the earth. In such cases what is more likely to happen is this, that the highly charged cloud existing over the neighborhood of the building provided with a rod will, if the conditions are favorable, suddenly discharge itself into the rod and the discharge be thus carried to ground. On the same reasoning it must be admitted that the presence of a lightning rod may, and perhaps often does, conduce to a building being struck by lightning, but it is much better to have the building struck a number of times

without doing any harm than to run the risk of having it once struck while without any means of conduction of the current to the earth except through the poorly conducting portions of the building, which are almost sure to suffer injury or destruction.

I do not think that lightning rods are of much utility in the case of buildings which have metal pipes running from the ground up to the highest story and through the roof, especially if these pipes should extend to a considerable height above the building, or above the highest part of the building. In case the building has a metal roof, with pipes running from the ground to the roof, there is little liability of damage being done below the roof, but any chimney which projects above the roof might be struck and shattered. In such cases a connection from the pipe or metal of the roof to a short rod running up the chimney and extending above it a short distance would be advisable. Lightning rods are but little use for buildings adjoining tall chimneys or church spires themselves provided with good lightning conductors. The actual area which is protected by a church spire provided with a lightning conductor has never been satisfactorily determined, but it is probably at least equal to that of a circle whose radius is eqnal to the height of the spire or chimney above the top of the building to be protected.

All that I have said in relation to the effectiveness of the lightning rod, implies, of course, that it be properly put up—that is, pnt up with a knowledge of the conditions of the service which is to be had from it—and that it be thoroughly connected with the ground at its lower end. Merely running the end of the rod into the ground a short distance, as sometimes done, is by no means sufficient. A connection of the system to gas or water pipes generally furnishes a good ground. The running of the lower end of the rod, made of some metal which cannot be easily corroded, either into a pit or well filled, with broken coke or tin scrap, will make a good ground, provided the well is deep enough to be always in a moist state. A still better way is to fork the end of the rod into several branches, which run away from the building and pass downward into several small pits or wells,with the conducting material, such as coke, iron borings, tin scrap, or the like, placed in them.

The most perfect lightning protection is obtained when the building is virtually in a metallic cage, the parts of which in connection with the earth are very thoroughly grounded or connected with the moist stratum. Such thoroughness as this is, however, not necessary. With even a large building the carrying of a conductor down each corner and grounding it as above mentioned would be sufficient. Of course the rod should have sufficient metal in it not to be injured by the heaviest possible discharge which would be liable to pass over it. It should, in other words, be built with a factor of safety, so as to be able to carry to the ground all the current which could ever reach it from the clouds. I think it is pretty generally conceded that ½-inch iron rod has never been known to be injured by the passage of a lightning discharge through it, and that such rod conducts the discharge freely enough for the purpose. Experience, of course, is to be the teacher in this case. A lightning rod made of galvanized iron pipe, say 1-inch pipe, used with the screw joints well secured and painted so as not to rust at the joints, would be about as good a conductor as could be desired. A flat strip of copper securely tacked to the building and running down its corners, the dimensions of the copper being, say, $\frac{1}{16}$ inch thick by 1½ inches wide, would also answer, and is in many respects a good form of conductor. If the metal aluminum becomes cheap enough I think an iron bar covered with this metal would be an excellent conductor on account of the small liability of the aluminum to rust.

Concerning the action of a lightning rod in saving a building from harm, this can be briefly stated to be the mere interposing of some good conductor in the path of the lightning discharge, so that the charge can be carried to earth, or the electric strain relieved, without the necessity for following poorer conductors, which, if traversed, would be torn to pieces or destroyed. More scientifically, it may be stated to be the provision of a path or centre of action for the discharge in the vicinity of the building of such a character that the discharge selects it in preference to forming a centre of discharge or path for itself through the building, which may be made of materials not able to carry the discharge without destruction. The concentration of the energy of a discharge on ordinary building material, such as wood, stones, brick or plaster, gives rise to destruction from the mere fact that these substances are not capable of conveying the energy without being highly heated. If wood be suddenly heated the watery vapor in it forms a gas and explodes it. The destructive effects, then, of the electrical discharge are due to expansion of gases, or the production of vapors within the material damaged.

Lightning rods need not be insulated from the building. It matters very little whether they are or are not insulated, as the ordinary provisions for insulation, so far as a lightning discharge is concerned, are practically *nil*. The insulation given to a lightning rod is frequently that which is not good enough for a telegraph line where the pressure of the current on the line may not exceed in all 200 volts, while in the lightning discharge the pressure may be many millions of volts. Where there are large masses of metal in a building it would do no harm as a rule to connect these masses to the ground as well as to the lightning rod ; and it may be said also that where a building is filled with masses of metal or machinery, damage from lightning could be largely obviated by connecting the various masses of the metal one to the other and to the ground. It is not, however, essential that they be actually connected to the ground ; for if a mass of metal in the building is but slightly separated from the ground wire by what is known as a discharge space, it will be quite sufficient to allow lightning to pass. A slight opening between two parts of a conductor constitutes a discharge space. Such discharge spaces and protective arrangements are used commonly on telegraph and telephone lines, in which the lines, although they are not connected to earth at each instrument, may be so near the earth by the provision of a discharge space between the line and earth that they are practically connected.

The effectiveness of lightning rods depends, I think, not alone upon their cross sections nor alone upon their surface. It is as much a mechanical as an electrical question. There needs to be a sufficient cross section of metal not to be melted by any discharge, and it is best that the metal be made in the form of a pipe or flat strip, since the tendency of the lightning discharge is to follow the surface portion of the conductor. This is due to the fact that it is an extremely quick discharge and may take upon itself an oscillating character. This means that each spark which connects earth and cloud is not a stream of something running in one direction, but merely a core or axis for a set of disturbances or reliefs of pressure which may act alternately in opposite directions during the short intervals through which the flash lasts. The oscillating action may be illustrated by fastening the end of a thin steel rod and bending it by carrying the free end to one side. This, if let go, will be followed by a series of oscillations made very quickly, but which are akin to oscillations of a pendulum. The relief of electrical pressure is in lightning so sudden as to result in the action of relief going too far, after which a relief in the opposite direction ensues, back and forth, until all of the energy of the discharge has been used up in the form of light and heat.

This must not be confounded with the action which often occurs during thunderstorms, when two, three or more separate discharges are visible separately to the eye, and follow down the same path or the track which has been opened by the first discharge. This is a phenomenon common enough and easily observed, but it has no relation to the oscillations of a single lightning discharge. These oscillations, if they exist at all, are in periods inconceivably small, and therefore are not to be discovered by the unassisted eye. Neither do I wish to be understood as subscribing to the opinion that all lightning discharges are oscillating in character. I am convinced from my own observation that very many lightning discharges, particularly those which pass over great lengths of clouds, are more apt to be discharges of some duration. Observation over a long period of years has led me to think that it may be possible that the discharges in some instances have a measurable rate of progress from cloud to cloud, and perhaps to earth. The photographic plate, which is being more and more applied to the study of lightning discharges, will some day resolve this doubt.

Manufacturing.

This department of the "Canadian Manufacturer" is considered of special value to our readers because of the information contained therein. With a view to sustaining its interesting features, friends are invited to contribute any items of information coming to their knowledge regarding any Canadian manufacturing enterprises. Be concise and explicit. State facts clearly, giving correct name and address of person or firm alluded to, and nature of business. Subscription $1.

THE first locomotive boiler built entirely in Stratford was turned out of the Grand Trunk railway shops a few days ago.

THE Miramichi Telephone Company is being incorporated at Chatham, N.B., for the purpose indicated by the name.

THE capital stock of the British Columbia Iron Works Company, Vancouver, B.C., will be increased from $100,000 to $250,000.

THE Galt Electric Lighting Company, Galt, Ont., are about establishing an incandescent electric lighting plant in that town.

A SYNDICATE of Chinese capitalists are about building an extensive rice mill on the North Arm of the Fraser river, British Columbia.

THE Thermolytic Fuel Company of Canada has been incorporated at Napanee, Ont. with a capital of $12,000.00 to manufacture gas fuel, etc.

THE Deseronto Company has been incorporated at Montreal with a capital stock of $50,000, to manufacture fire-proofing, fire brick, drain pipes, etc.

MESSRS. JAMES ROBERTSON & Co., manufacturers of lead pipe, saws, etc., Toronto, are proposing to establish a branch of their works at Vancouver, B.C.

THE Northwest Wire Company is being organized at Winnipeg, Man., with a capital stock of $50,000 to manufacture wire fencing, barb wire, wire nails, wire staples, etc.

THE Chatham Electric Light Company, Chatham, N.B., is being incorporated with a capital stock of $20,000, for the purpose of establishing an electric light plant in that city.

MESSRS. JAMES PUNCH AND F. G. STRICKLAND, New Westminster, B.C., are about building a large and thoroughly model woolen mill, which is expcted to be in operation early next spring.

THE new electric light works at Chatham, N.B., are nearly ready to be put in operation. The Chatham Electric Light Company, who own these works, was recently organized with a capital stock of $20,000.

MR. E. INGLETON, Brantford, Ont., has invented a binder which will bind all kinds of grain with straw taken from the sheaf, while being cut. This machine will probably be placed on the market, in time for next year's harvest

CAPTAIN NOONAN, of Kingston, Ont., will build during the winter a new steamer for the route between that city and Montreal. She will be engaged in the grain trade, will have capacity to carry 39,000 bushels, and will cost $15,000.

MESSRS. ROBERT MITCHELL & Co., brass founders, Montreal, and the Toronto Radiator Company, Toronto, have opened a branch of their establishments for the sale of their goods in Vancouver, B.C., under the direction of Messrs. Muir & Boyd.

THE Toronto Drop Forge Company, whose place of business has heretofore been at 68 Esplanade West, Toronto, are about removing into their new factory at New Toronto, a manufacturing suburb of this city. Their building is 202x46 feet with annex 50x30 feet.

MESSRS. MCGUIRE & DRYDEN, manufacturers of flour mill machinery, are building a Noble & Snyder patent curved seive scalper and grader for the flour mill of the Citizens' Milling Company, Toronto. This, they say, will be the first machine of this kind ever used in Canada.

MESSRS. J. & A. BERTRAM, proprietors of the Toronto Steel Works, inform us that they are now manufacturing steel castings weighing up to 500 pounds. They are about enlarging their capacity by the addition of new furnaces, when they will be prepared to accept orders for steel castings up to 2,000 pounds.

MESSRS. GAST & Co, Toronto, are manufacturers of mineral wool steam pipe and boiler covering, for which they give the assurance that it is absolutely fire-proof, being the best non-conductor known. They offer to guarantee that it saves more fuel and gives higher steam than any other covering offered. Catalogues sent on application.

THE cost of electric as compared with steam power is most favorable for the former in the case of some wharf cranes on a London dock. A 10-ton and a 2-ton steam crane required for their operation $1,250 worth of coal per year, steam being required night and day. The cranes were fitted with electric gear at a cost of $1,500. A gas-engine drives the dynamo, cranes, a chaff-cutter, a corn-crusher and a common friction-hoist, at an expense of $280 for the year.

THE Toronto Drop Forge Company, New Toronto, have contracted with the Merril Surface Cattle Guard Company, Toronto, to manufacture for them all the Merrill patent cattle guards they may require in filling orders. The Merrill Company have contracted with both the Grand Trunk and Canadian Pacific Railways to supply all the cattle guards they may require along the lines of both these roads, and the Drop Forge Company have a big job ahead of them to supply this demand.

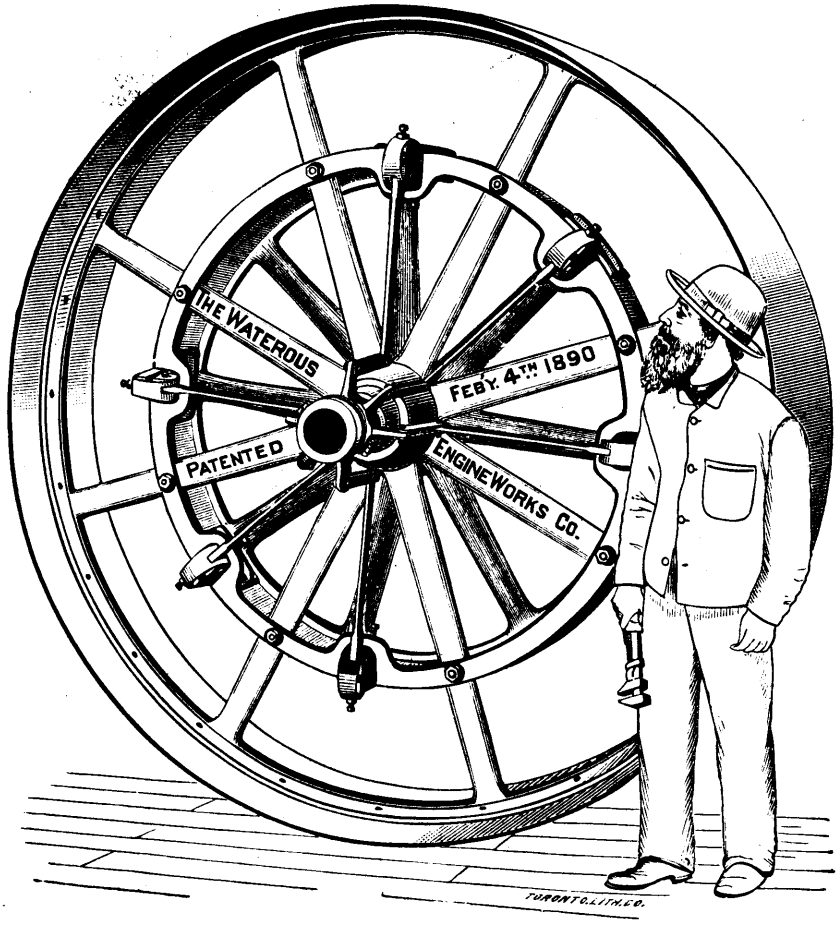
IT was recently stated in these pages that the Northey Manufacturing Company had been organized in this city, to take over and extend the business of Messrs. Northey & Co., manufacturers of steam engines and machinery, boilers, pumps, etc. This transfer has been made, and the new concern are now putting into their works some $10,000 worth of new machinery and otherwise preparing to at least double their output. Mr. J. P. Northey is general manager and Mr. H. S. Pell secretary-treasurer.

THE Albion Iron Works Company have contracted with the E. & N. Railway Company to deliver a new and thoroughly first-class steamer for the Comox route by July 1st next. This boat, upon the frame of which work has already been commenced, will be by far the largest and most powerful ever built in British Columbia. The dimensions of the new steamer are in brief: Length over all, 180 feet; breadth of beam, 40 feet; depth of hold, 12 feet. She will derive her motive power from twin screw propellers, and will be very similar in appearance to the *City of Kingston*.—Victoria, B.C., *Colonist*.

ALLUSION was recently made in these pages to the launch of the steamer *Constance*, built by the Polson Iron Works Company, of Toronto, at their ship yards at Owen Sound. The *Constance* was built for the Dominion Government for service in protecting the fishing interests in the Upper Lakes. She has been transferred to the Customs department and will do service in preventing smuggling on the St. Lawrence below Montreal. The Government have contracted with the Polson Iron Works Company to build a similar vessel for the fishery service for which the *Constance* was originally intended. The new vessel will be modelled on the lines of the *Constance*, except that she will be of lighter draught and necessarily greater beam. She will possess, however, equal carrying capacity and equal speed and will be built entirely of steel.

FRICTION GRIP PULLEY.

THE accompanying illustration is of the Waterous patent friction grip pulley, manufactured by the Waterous Engine Works Company, Brantford, Ont. This illustration is made from a photograph of one of the pulleys made for the Royal Electric Company, Montreal, the great size of it being accentuated by contrast with the workman standing beside it. This was one of three pulleys made by the Waterous Engine Works Company for the Royal Electric Company, two of which were 93 inches in diameter, with 18 inches face, and one 93 inches diameter with 22 inches face. We have been shown a telegram from the Royal Electric Company to the manufacturers, in which they say that these pulleys, which are now in service, are "giving entire satisfaction." The manufacturers are publishing a neat pocket size catalogue, in which a full illustrated description of this pulley is given, and which they will be pleased to send to those who may be interested, on application.



THE FRICTION GRIP PULLEY.

A FLOATING LOGGING CAMP.

THERE has just been turned out what may be considered a novel and useful craft, by the British Columbia Iron Works Company, Vancouver. It is a complete floating logging outfit and camp. They were first used in San Francisco about two years ago, and have given such satisfaction to the lumbermen that there are now 150 of them in use north of the Bay city. Mr. J. M. Stewart, hearing of the work they were reported to be able to do, and the great saving over present methods, sent a man down the Sound to investigate and see them at work. The advantages were so great over the present system of handling logs that he decided at once to get one, and placed his order with the British Columbia Iron Works Company. The wark has just been completed, and may be briefly described as follows: A 20x50 foot scow is used. The forward part is covered in and fitted up as a cabin, with bunks for fifteen men, kitchen, etc. The rest of the deck holds the machinery, which consists of a boiler (an upright one) and a 10-horse power engine and capstan, geared to 80-horse power, and a coil of steel cable. The scow is fitted with side paddles, and the shafting can be changed to propel her at a speed of from five to six miles an hour. A trial trip was made across the Inlet, and she worked satisfactorily. She was then anchored near shore and 700 feet of cable taken ashore and attached to a 4,000 foot log, and hauled down to the water's edge, through rough gravel and boulders, quite easily. With this logging outfit, a strip of 1,000 feet along a stream can be cleared up at a trifle of what it cost under the old system of having to buy oxen, pay for transportation and feed, and build stables for them and houses for the men. Now when a patch is cleared up, they can move from place to place without any expense. The whole cost, including boat, boiler, engine and capstan, cables, etc., does not exceed $3,500. The outfit has left to work at Secret Cove. If she proves as satisfactory in general work as she did on her trial trip, it will not be long until they drive the old style of logging outfits to the wall.—Victoria, B.C., *Commercial Journal.*

THE TORONTO STEEL WORKS.

IT has been said or written that the consumption of sulphuric acid is the measure of a nation's advancement in civilization. We would prefer to say that the consumption of iron and steel is the measure of a nation's advancement in art, manufactures, commerce and civilization. And any new invention or process whereby the manufacture of iron and steel can be cheapened or improved, is of the highest moment to the general community, and more especially to that particular part of the community in which the new process takes root to live and flourish and find a home for itself

When Huntsman successfully melted his first pot of crucible steel he laid the foundation stone of the Sheffield of to-day, and gave England a trade going out by every point of the compass to the uttermost parts of the earth.

In a very quiet and unostentatious way, a steel works has been started in Toronto by the firm of J. & A. Bertram, that has in it the germs, the possibilities of making Toronto the Sheffield, the Pittsburgh of Canada.

That this may be the natural, the manifest destiny of Toronto no one will deny, when we consider the immeasurable deposits of iron and nickel at her back, and when we consider the toughening and strengthening effects of nickel in steel as voiced aloud to the world by experiments in the United States and elsewhere.

Wrought-iron or mild steel, when run into sand moulds, as in ordinary foundry practice, forms castings that are porous, or full of blow-holes and unfit for use. The Messrs. Bertram claim to make mild steel castings that are solid, homogeneous and free from blow-holes. They do not claim that this has not been done, or is being done elsewhere, but any one acquainted with the voluminous literature upon the subject, and the difficulty experienced by machinists and engineers in obtaining solid mild steel castings, will at once recognize the importance of their manufacture, viewed from a commercial and economic standpoint.

According to the *Railroad Gazette* of April 24, 1891, "At the present time two scientific societies in England are investigating the matter." Their castings are of a fine quality of steel, and can be forged, tempered and hardened as ordinary tool steel, which, practically, to all intents and purposes, they are, and are not to be confounded with highly carbonized nor malleable, so called, steel castings found on the market.

It is well known that ordinary iron castings, according to their size and shape, are liable to contain blow-holes, shrinkage and other cavities. After overcoming the inherent blow-hole forming tendencies of mild steel, Messrs. Bertram had also, in their first castings, with the skilled labor they employed, to meet and overcome and eliminate the error and malpractices prevalent in ordinary foundry practice This also has been successfully done All substances are chemically acid, basic or neutral, and, in scientific and practical steel-making, the great line of clearage lies between the acid and basic processes. In the experiments and researches in connection with steel founding, reaching sheer down to the fundamental principles and following up some of the many ramifications of thought connected with steel melting, Messrs Bertram have

apprehended cardinal principles and adopted a process of their own which they say cannot properly be called either basic or acid, but which, for want of a better name, they call the "neutral process."

They say it may only be the recovery of a lost art, but it promises well to enable them in the near future to make steel rivalling in fineness of quality and texture the best Bombay, Woolz or Damascus steel, and opens up to them a new and almost unoccupied field of enterprise, the casting of solid steel axes, hammer tools and other implements at present forged into shape under the hammer.

AUSTRALIAN WOOL SCOUR.

MESSRS. THEO. H. EATON & SON, importers of and dealers in dyes, dyestuffs, chemicals, woolen factory supplies, etc., Windsor, Ont., are manufacturing a concentrated Australian wool scour which they describe as being the strongest, cheapest and best wool scour in the market—that wool scoured with it is left clean, soft and lofty. Regarding this article Messrs. Eaton say:—"In no department of a woolen or knitting mill should greater care be exercised in the selection of supp ies than in the scouring-room, and yet in many mills this is entirely overlooked. Alkalies and soaps of all kinds are used, and the result is the wool is half scoured, or, if clean, is harsh and heavy. The Australian Wool Scour does the work quickly and perfectly, does not injure the fibre, and leaves the wool soft, silky and lofty. It will scour wool cheaper than any wool scour, compound or soap ever made." One of the largest mills in the West recently wrote them:—"We find the Australian Wool Scour the very best article we have ever used. Do not hesitate to say too much in its favor. It is the best and at the same time cheapest wool scour in the market." The article comes packed in casks, barrels and kegs.

THE Dodge Wood Split Pulley Co., of Toronto, have recently completed a very striking illustration of their rope transmission system at the new works of the Canadian Pacific Railway Company at Toronto Junction. The drive in this case is carried from the driving wheel on the engine over intermediate roofs and yards to the wood-working shops, a distance of 460 feet. The power is conveyed in a positive and noiseless manner, and to the complete and entire satisfaction of the railway company. All who are interested in the successful transmission of power to a distance, should see this job

WHEN recently going through the works of the Cant Bros. Co., Galt, we saw a machine such as we had hardly ever seen before in Canada. It was a machine by means of which a barrel could be made in a couple of minutes. The staves are put in singly, and by the time the cylinder has completed its revolution, all that is required is to slip on the two hoops which are suspended ready at either end. By means of a lever the cylinder is then made to partially collapse, when the barrel can be drawn off ready for the insertion of the two head pieces. It was for this machine that the firm was awarded the Silver Medal at one of the Toronto Industrial Exhibitions.

THE Vancouver Steamship Company, recently organized, has let the contract for a steamer to Messrs. Brown & Purdy. The keel has been laid on False Creek, the lumber coming from Morse's mill. She will be of 300 tons, 120 feet long, 26 feet beam and 9 feet hold, fitted with twin screws, with engines capable of giving a speed of twelve or thirteen knots. She will have accommodation for thirty saloon passengers, with the most elegant appointments, and will cost about $25,000. Sufficient business for her is expected in and about Vancouver and the Sound.—Vancouver, B.C., *Colonist.*

THE buildings of the Nut and Bolt Works, St. John, N.B., which were almost completely destroyed by fire on November 19th, comprised the main structure of brick, two stories, about 120x40 feet, and the forge building of wood, one story, 100x45 feet. The large building was built in 1881, when the company commenced business. The forge department was erected four years ago. In the buildings was a large and valuable quantity of stock and machinery. The first building was used as a manufacturing department, with stock rooms, offices and engine room. The wooden building, as suggested by its name, was used exclusively for forging.

THE Nova Scotia Steel and Forge Company, New Glasgow, N.S., are calling attention to the fact that they are manufacturers of hammered and rolled steel made by the Siemens-Martin (open hearth) process; also marine railway and machinery forgings up to 20,000 pounds weight; round, square and flat machinery steel; mild steel for rivets, bolts, thresher teeth, etc; plow beams, soft centre and solid steel plow plates; harrow discs, plain and cut-away, both blank and finished; agricultural steel cut to pattern; spring, sleigh-shoe, tine; toe-caulk and crowbar steel; steel nail plate; binder bars; Z bars, and special sections of every description; hay-rake, cultivator and harrow teeth; agricultural springs, etc.

MESSRS. SCURRY AND MATTHEW, Vancouver, B.C., patentees of a subaqueous mining machine, are having a full-sized working model manufactured at one of the foundries in that city. It may be briefly described as a submerged flume with a series of steel brush attachments to brush the bottom of a river. When the flume is filled it is hoisted on deck. It will work in from forty to fifty feet of water. When this machine is finished it is proposed to try it on the Fraser River, where good paying dirt has been found at low water for years. If the machine can sweep up the accumulation of ages from the bottom of the Fraser River, the inventor, Mr. H. T. Scurry, will reap a well-deserved reward for his perseverance.

AT noon yesterday a handsome little steamer glided from the stocks at Warren's wharf, and was duly christened the *T. W. Carter*, by Miss M. G. Carter, in the presence of a large gathering of spectators. The vessel was built for the San Juan Fishing Company, and will be the first of her class engaged in the fishing industry in this port. She is specially designed for the trade, being fitted up with cold storage apartments. She is sixty feet in length, with a beam of eleven and a draught of six, and built to carry twenty-five tons. The machinery is being supplied by Messrs. Spratt & Gray—the engine being a 20-horse power nominal. The general fittings of the boat—and she is a beauty in outline—will be comfortable and neat. She is built by H. R. Foot, who, with T. W. Carter, is her owner.—Victoria, B.C., *Colonist.*

THE Canadian Pacific Railway Company's shops at Montreal have just completed and sent out a magnificent parlor car called the Penobscot, the first of the kind built in Canada. In one end is a large and beautifully furnished stateroom, a novelty in a parlor car, finished in satinwood. In the other is located the smoking car, finished in mahogany. The main saloon is divided into three compartments, finished in satinwood, which gives a bright and cheerful appearance. The windows are broad and afford a good view of the passing scenery. The car is fitted throughout with electric bells by which the porter can be instantly summoned. It will run every other day, commencing this morning, between here and Montreal. The saloon affords accommodation for thirty passengers. Altogether the car is one of the finest specimens of railway stock in America.

THE Cant Bros. Co., of Galt, have just shipped to Messrs. N. Wenger Bros., of Ayton, Ont., a barrel machine, by means of which a barrel can be made in a couple of minutes. The staves are put in singly, and by the time the cylinder has completed its revolution all that is required is to slip on the two hoops, which are suspended ready at each end, when, by means of a lever, the cylinder is made to partially collapse and the barrel can be drawn off ready for insertion of the two head pieces. It was for this machine that the firm was awarded a silver medal at one of the Toronto Industrial Exhibitions. This same firm shipped some machinery last week to a firm in Prince Edward Island, showing that the Galt make of machinery finds its way to all parts between the Atlantic and Pacific and to the isles of the sea.—Galt, Ont., *Reporter.*

MR. JAMES LYDIATT, Toronto, is exploiting the formation of the Erie Glass Company, who propose establishing glass works at Port Colborne, Ont., at the south end of the Welland Canal. The company is being organized with a capital stock of $100,000, thirty per cent. of which will be sufficient to build and equip one ten-pot furnace, costing, for buildings and furnace and tools, $15,000, leaving a like amount for working capital. Port Colborne has offered to donate a five-acre site and exemption from taxation for ten years, and free natural gas for one ten-pot furnace for five years. The site offered is alongside the track of the Grand Trunk Railway and only a few yards from the Welland Canal. There appears to be an abundance of natural gas in that district, a well now offered to the proposed company having an estimated production of 500,000 cubic feet per day. The works would be run largely upon the production of glass goods for electric lighting. Last year more than $500,000 worth of flint glass ware was imported into Canada, more than $300,000 worth of which was consumed in Ontario. The enterprise seems to be an assured success.

Industrial and Trade DIRECTORY.

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DOMINION DYEWOOD & CHEMICAL CO., sole agents in Canada for Farbenfabriken, vormals Friedr Bayer & Co., Elberfeld, Germany and Read Halliday & Sons, Huddersfield, England.—All shades for woolen, cotton, leather and paper manufacturers. Latest information on dyeing as well as dyed samples on application.

McARTHUR CORNEILLE & CO., Montreal.—Supply of best quality at closest prices, every description of coloring materials required by manufacturers of woolens, cottons, silks, paper, leather, etc. Are sole agents in Canada for the celebrated aniline dyes of A. Porrier, Paris.

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DOMINION BRIDGE CO. (Limited), Shops at Toronto, Ontario, and Lachine, Quebec.—Builders of Steel and Iron Railway and Highway Bridges.

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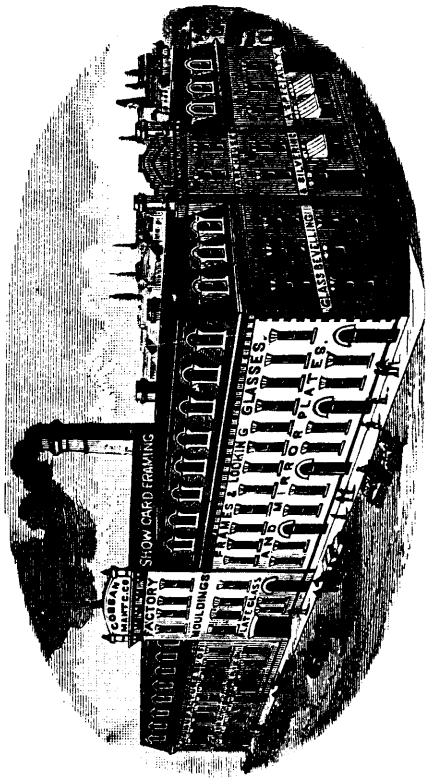

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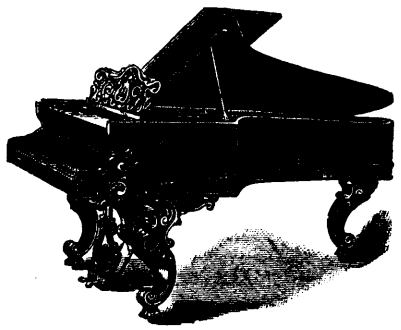

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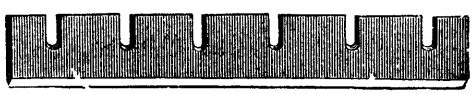

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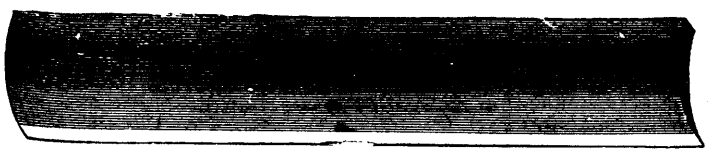

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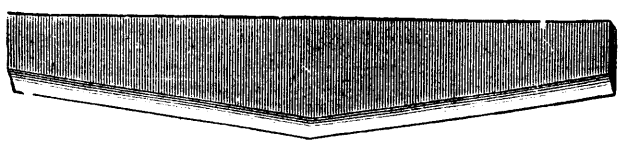

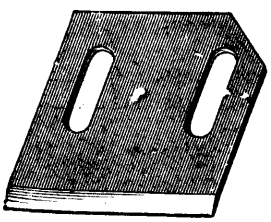

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