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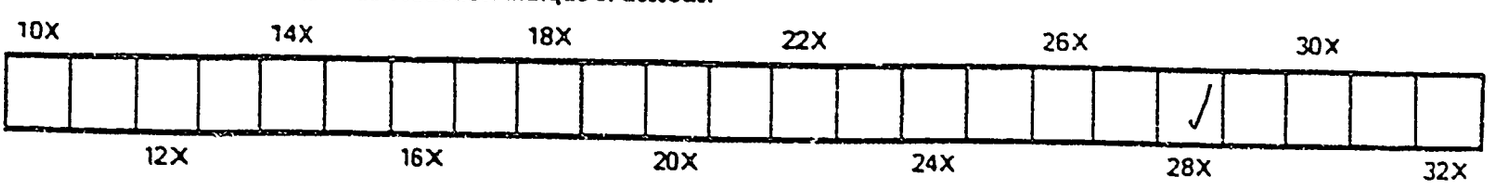

CANADIAN MANUFACTURER AND INDUSTRIAL WORLD

DEVOTED TO THE MANUFACTURING INTEREST OF THE DOMINION

VOL. 18. TORONTO, FEBRUARY 21, 1890. No. 4.

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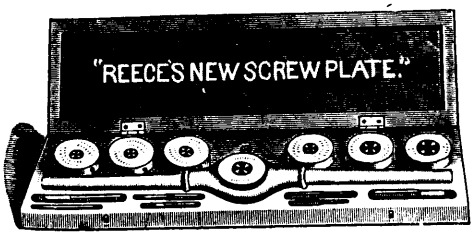

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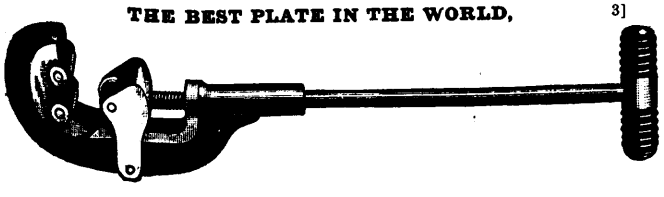

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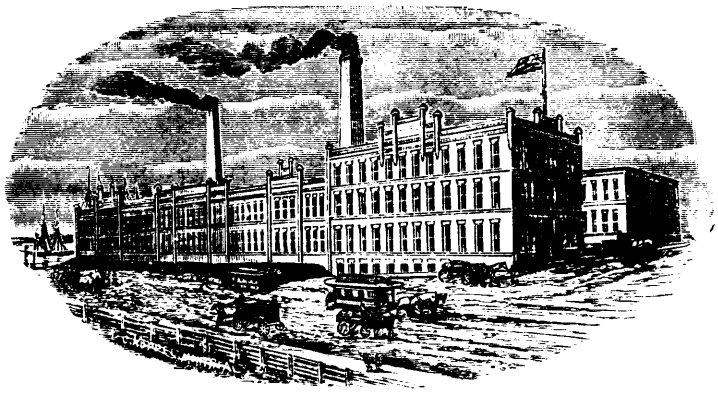

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CANADA'S FOREIGN TRADE.

In another page will be found an article on "The Foreign Trade of Canada" reproduced from the editorial pages of *Bradstreet's.* It analyses in a manner the trade of this country with Great Britain and the United States, but it will be observed that nearly all of the facts and figures given have reference to the year 1888, although our contemporary must have been possessed of the Dominion Trade and Navigation Blue Book for the last fiscal year. It will be observed that the exports of Canadian products in 1889 preponderated in favor of the United States in the products of the mines, fisheries, forests, agriculture, manufactures and miscellaneous; while only the item "animals and their products" preponderated in favor of the United Kingdom; the totals showing that our exports to the United States aggregated $36,503,297, and to the United Kingdom $33,504,344. The exports to the United States amounted to 47·20 per cent. of the total exports of the Dominion, and the exports to the United Kingdom to 44·44 per cent., leaving only 8·36 per cent. for all other parts of the world. In like manner the Dominion imports from the United States were 50·06 per cent. and from the United Kingdom but 35·56 per cent. of the total importations.

Referring to the principal imports into Canada from the United States and the United Kingdom respectively in 1888, a table is given that shows all the items where the total from either country exceeded $1,000,000; and from that table we re arrange as follows :—

PRINCIPAL IMPORTS 1888.

	From United States	From United Kingdom
Breadstuff	$7,413,433	$97,814
Coal and Coke	3,576,447	204,105
Wood and Manufactures	1,223,772	78,133
Settlers' Effects	1,248,062	409,997
Coin and Bullion	2,041,552	131,077
Cotton and Manufactures	761,623	3,326,324
Fancy Goods	240,351	1,247,415
Linen Goods, etc.	31,189	1,304,280
Iron and Steel and Manufactures	4,107,504	4,338,237
Provisions	21,025	2,339,911
Silk and Manufactures	124,818	2,448,075
Woollen Goods	142,370	9,140,940
Metals and Manufactures	596,874	2,507,358

These facts are very suggestive. Less than a hundred thousand dollarsworth of breadstuffs were bought from Great Britian, but nearly seven and a half millions worth from the United States—Britain is not an exporter of breadstuffs. So, too, as to coal and coke, but very small quantities of these articles came from across the water, and if these quantities were much larger the inland transportation from seaports to consuming points, chiefly in Ontario, would forbid the trade; while the contiguity of the Pennsylvania coke ovens and the coal mines in that State and in Ohio and Indiana enable Ontario consumers to obtain their supplies there quite as cheaply in many instances, and more cheaply in many other instances than American consumers; and then, too, Great Britain is not a large exporter of coal or coke. And this fact also applies to that country as regards wood and manufactures thereof, and all exports of that character from there are previously imported—the "raw material"—where it is worked up. But the United States is a large producer of such "raw material"—timber and lumber—and exports very largely of its finished products—furniture, carriage goods, etc., not only to Canada, but to Great Britain also. The items regarding settler's effects and coin and bullion show that there is more than three times as much immigration into Canada from the United States than from Great Britain, and that the United States pays about sixteen times as much coin and bullion to Canada as Great Britain does.

On the other hand all the other enumerated items show strongly in favor of Great Britain. Although the United States is the largest producer of raw cotton in the world; although that country possesses some of the finest cotton mills in the world, and although the raw cotton from which the manufactures of cotton imported into Canada from Great Britain is first carried there from the United States, our importations from the latter country are less than a fourth of our importations from Great Britain. We buy five times as much fancy goods from Great Britain as from the United States, and of linen goods, etc., forty-two times as much. As regards iron and steel and manufactures thereof the value of importations from the two countries approach each other with remarkable nearness, the difference in favor of Great Britain being only a little more than two hundred thousand dollars; and this fact illustrates the fallacy of the Free Trade doctrine that the duty enhances the price; for if this were actually so, the American price should be very much higher than the British price—so much higher as to preclude any trade with Canada in competition with Great Britian; while the figures show that while in the year named we bought iron and steel goods from the latter country to the value of $4,339,237, we also bought in the same year from the United States to the value of $4,107,504. In silk and woollen goods our importations from the United States aggregated only $267,000, while Great Britain furnished us with an aggregated value of more than $11,500,000, and this indicates that Canada produces in her own factories about

the same lines and qualities of goods as are produced in the United States; (and for this reason we do not import very largely from there,) and that that country cannot yet compete successfully with Great Britain in the production of the higher and more expensive grades of such goods as are imported into Canada. The United States is herself a verylarge importer of such goods from Great Britain.

TARIFF DISCRIMINATION.

In a preceding editorial, in discussing "Canada's Foreign Trade," attention is drawn to the trade between Canada and the United Kingdom, and the United States; and figures are given showing that in certain lines of merchandise the larger business was done with one country, while in certain other lines the larger business was done with the other country. In this issue will also be found an article, reproduced from *Bradstreets*, discussing this subject.

According to the Dominion Trade and Navigation Returns, our trade with Great Britain has fallen off of late years, the aggregate in 1874 having been $108,083,624, while in 1889 it was $80,422,515. On the other hand, our trade with the United States increased from $90,524,060 in 1874 to $94,059,844 in 1889; the grand total import and export trade of Canada with all nations being in the former year $216,756,097, and in the latter year but $198,862,614. The value of goods entered for consumption in 1874 was, from Great Britain $63,076,437, and from the United States $54,283,072; while in 1889 the imports from Great Britain amounted to $42,317,389. and from the United States $50,537,440. The grand total value of imports from all countries in 1874 amounted to $127,404,169, and in 1889 to $109,673,447. The duty collected upon imports in 1889 amounted to—from Great Britain $9,450,242, being an average percentage of 22 3 per cent; and from the United States $7,371,148, being an average percentage of 14·3 per cent; the grand total of duty collected on imports from all countries being $23,724,316, the average percentage being 20 6 per cent. The percentage of duty upon British importations was 1·7 per cent. above the average, and that upon American importations 6·3 below.

This shows on the face a tariff discrimination against Great Britain, and in favor of the United States. Of course there is no tariff discrimination in favor of or against any nation, the seeming difference arising in the fact that the duty upon certain classes of merchandise is higher or lower than that upon certain other classes of merchandise; and that the importations from Great Britain are generally of the higher classes, while those from the United States are of the lower classes. It must be borne in mind that this percentage of duty is calculated upon all imports, both dutiable and free; and that if it were calculated only upon dutiable imports, it would be considerably increased as regards the United States, from which so large a proportion of the imports are of non dutiable merchandise; and but slightly affected as regards Great Britain, from whence our importations of non dutiable merchandise are merely nominal.

As is hereinbefore shown, the total value of all British merchandise, dutiable and free, imported into Canada in 1889 amounted to $42,317,389, upon which the duty collected was $9,450,242, and that the value of all such American merchandise was $50,537,440, upon which the duty collected was $7,371,148. But it is important to bear in mind that the dutiable merchandise imported from Great Britain amounted to $32,219,807, and that from the United States to $28,982,283; and considering the fact that there was but $10,097,582 of non-dutiable merchandise imported from Great Britain, and $21,555,157 from the United States, it will be seen that the average duty levied upon dutiable merchandise was—from Great Britain 29·3 per cent., and from the United States 25·4 per cent. It should also be remembered that the dutiable merchandise imported from all countries into Canada in 1889 amounted to $74,475.139; that the duty collected was $23,742,316, and that the average percentage of duty collected upon these dutiable imports was 31·8 per cent. It is true that the total importations from the United States—dutiable and free—in 1889 were $8,220,051 larger than such importations from Great Britain; but in considering the matter of so-called tariff discrimination, it is important to remember that the importations of dutiable merchandise from Great Britain during that year were $3,237,524 greater than the importations of dutiable merchandise from the United States.

MENDACITY *vs.* FACTS.

The mendacity of the Grit newspapers in disguising and distorting facts regarding the operations of the tariff is disgusting. Many of these papers have read or heard something of some of the statements made in the Dominion Trade and Navigation Returns regarding the import and export trade of Canada, and forthwith they cook figures to show that in the operations of the tariff Canada discriminates against Great Britain and in favor of the United States. They show that our total of trade with Great Britain is less now than it was several years ago, and that our total of trade with the United States is increasing; and they show that whereas the average rate of duty collected upon imports from Great Britain is 22·3 per cent. of the value thereof, the average duty upon imports from the United States is only 14·3 per cent; arguing therefrom that unfair discrimination is made against Britain and in favor of the United States. The *Mail* has the candor to say that this arises from the larger importation of free goods from the latter country, but that nevertheless "the fact cannot be a pleasant one for Britain, which admits our exports free, while the United States taxes them." The Montreal *Herald* says:—'No argument can wipe out the fact that the National Policy tariff discriminates against Great Britain. Great Britain allows us free access to her markets with all our products except liquor and tobacco; Canadian Tories respond to the unselfishness of the Mother Country by taxing British goods at an average of 22·3 per cent., while they only tax American goods 14·3 per cent." The Toronto *Telegram* says:—"A tariff which discriminates in favor of imports from the United States as against those from Great Britain can scarcely be considered as a means to secure a closer union of the Empire. This anomaly in the Canadian tariff is probably largely responsible for the unfavorable showing of our trade with the Mother Country as compared with that done with the neighboring Republic. It is scarcely in accordance with the professions of

the party now in power to continue a system of taxation which bears more heavily against the Mother Land than a rival nation."

Of course the argument or contention of these Grit journals is that Canada should have no National Policy of Protection, but that our tariff should be "for Revenue only"; and of course they stultify themselves in arguing that Canada should not continue a system of taxation that bears more heavily against one nation than another. This is stultification because it is the policy of Canada to impose no duties whatever upon certain articles of merchandise, admitting them free of duty; and Canada is not to be blamed because the United States possesses in abundance many of these non-dutiable articles while Great Britain does not thus possess them. The importation of merchandise is strictly a matter of business, and it is bought wherever it can be had on the most advantageous terms to the buyer These Grits do not object to the tariff free list, in fact they are constantly clamoring to have the duty upon dutiable articles lowered or removed. It is because the United States sends us such large values of non-dutiable merchandise—last year it amounted to $21,555,157 as against $28,982,283 of dutiable merchandise—that there appears to be some discrimination in favor of that country; another element to be considered being the large importations of bread stuffs, coal, wood and manufactures thereof, etc.; very little of which articles come from Great Britain simply because Great Britain does not have them to export. Where competition is had between the two countries, however, as in the trade in iron and steel and manufactures thereof, and where these importations are very large, whatever difference there is is in favor of Great Britain; for in 1888 such importations from Great Britain were valued at $4,339,237, while from the United States they were $4,107,504,—a difference of $231,733. It is true that in certain classes of merchandise upon which only the lower duties prevail, or which are upon the free list, the importations from the United States are much greater than from Great Britain; and in these classes we enumerate bread-stuffs, coal and coke, and wood and manufactures thereof, all of which are dutiable, and anthracite coal, hides, tobacco, raw cotton and wool, and settler's effects, all of which come in free of duty; but on the other hand the importations from Great Britain represent much more expensive goods; and in these the importations from that country are vastly larger than from the United States; and in these classes we enumerate manufactures of cotton, fancy goods, linen goods, provisions, manufacturers of iron and steel, manufactures of silk and woollen goods; but very few if any articles of British production, and these in but very small quantities, coming in free.

As we have shown, the Grit papers display the fact that the average rate of duty collected upon imports from Great Britain last year was $22·3 per cent. while that levied upon imports from the United States was only 14·3 per cent. They might have also shown that the average percentage of duty collected on imports from all countries was 20·6 per cent. This method of computing average percentages upon the totals of imports—dutiable and free—is not fair to the discussion; for all the imports last year from certain countries were non dutiable among which countries we enumerate the Argentine Republic, the Central American States, Roumania, Hayti and Venezuela; while from certain British Possessions, Greece, Sandwich Islands, Spanish Possessions in the Pacific Ocean and Peru all the importations were dutiable and there were no importations of non dutiable goods. Whatever value may attach to a knowledge of what the average percentages upon the totals of dutiable imports really are is embraced in this: The value of the total importations of dutiable merchandise into Canada in 1889 amounted to $74,475,139, upon which the duty collected was $23,742,316, the percentage being 31·8 per cent. The value of importations from Great Britain aggregated $32,219,807, in which $9,450,242 duty was paid, the percentage being 29·3 per cent.; and the value of importations from the United States aggregated $28,982,283, on which $7 371,148 duty was paid, the percentage being 25.4 per cent.

WAGES AND COST OF LIVING.

Mr. Goldwin Smith has written a letter to the *Charity Organization Review*, of London, England, at the request of the Conference of Associated Charities, of Toronto, of which he is chairman, in which he addresses "a word of warning to persons who may be intending to emigrate to Canada." In this letter Mr. Smith says that "of the people in this city not less than four per cent., including probably a large proportion of emigrants, or new comers," are paupers. He says further that "the cost of living in Toronto for a working man is about thirty-five per cent. greater than in London. Wages in Toronto are higher in about the same proportion."

In an editorial, "Prosperity of Canada," in our issue of Feb. 7th, allusion was made to the character of the so-called "paupers" who are absorbing the assistance that the good people of Toronto have appropriated for the deserving poor in their midst, by which it was shown that these sponges are not working people at all, nor are they even residents of Toronto, but the offscouring of the surrounding country, drawn hither by the food, shelter and clothing that they imagine can be had here freely for the asking; and an evidence of this is the fact that but a few days ago a gang of nearly a dozen of these tramps, who had been provided with a night's lodging and a good substantial breakfast the next morning, actually refused to cut a small quantity of firewood, as they had been requested to do, in remuneration for the hospitality extended to them.

We do not question that Professor Smith is approximately correct in stating that "wages in Toronto are thirty-five per cent. higher than in London," but we challenge the statement that the cost of living here is thirty-five per cent. higher than there. The cost of living in Canada is not as great as it is in the United States, but for the purposes of this argument we call it the same. Mr. Jos. D. Weeks, an American statistician of high authority, who traveled extensively in Great Britain and the Continent for the purpose of investigating this very question, says: "One dollar will buy more in the United States of such things as the working man uses than 4s. 1½d. will in England. It will buy considerably more flour, meat, provisions, bacon, ham, vegetables, eggs, butter, cheese farm products of all kinds, tea, coffee, oil, a little less sugar and in many parts of the country more fuel. As to dry goods

and clothing, it will buy more sheeting, shirting, prints and calicoes, and as much of many kinds of clothing such as workingmen wear, but in some cases less." The New York *Press* recently gave a carefully prepared table showing the comparative cost of living for a working man's family for one week in London and New York. The items showed a footing of $7.36 in London and $6.72 in New York for the same quantities of the same articles. By a similar table the *Press* showed that a man may clothe himself more cheaply in New York than in London.

Professor Smith says that Canadian workmen get thirty five per cent. more for their labour than British workmen. They get approximately the same pay as in the United States Recently the American Protective Tariff League investigated the wage question in Great Britain, and published a tabulated statement of comparisons between the two countries, the industries alluded to including cotton, woolen, silk and thread mills, chemical works, salt making, pottery, iron ore, blast furnaces, rolling mills, steel works, glass works and fifty or more other occupations, including agricultural wages; the result showing that the wages of the American workmen were from fifty to 300 per cent. greater than his English fellows. Hon. William P. Frye, of Maine, who recently made the tour of Europe with his eyes open and note-book in hand, in a speech delivered before the Home Market Club, at Boston, stated that from the best sources he could reach in England the average wages there were not one-half of the average wages in the United States. There were nearly 90,000 women at work in cotton mills in Manchester, and they were not averaging $60 a year for their wages; and workmen generally were not averaging over $125 or $135 a year. Mr. Frye said he had visited the Longloan Iron Works on the Clyde, in Scotland, which cover thirty-five acres of ground. The wages of laborers there were from 2s. 2d. to 2s. 6d, a day, and skilled workmen 3s. to 7s. a day—most of them at the lower figure. He quoted what Mr. John Bright had said—that in Glasgow alone 41,000 families out of every 100,000 live each in one room.

Professor Goldwin Smith does not seem to be well posted on this branch of his subject.

BRITISH CONNECTION.

During the year 1874, the imports of merchandise into the United Kingdom from British Possessions amounted to £82,162,839, which, in 1888, had increased to £86,915,738; and the exports from the Kingdom to the Possessions increased in the same time from £77,910,028 to £91,424,858. On the other hand the imports from foreign countries amounted to £287,919,862 in 1874, and in 1888 they had increased to £300,720,005, while the exports decreased from £219,740,436 to £206,460,378 in the same time. Commenting on these facts the *British Trade Journal* points out that to Australia alone British exports rose from £20,668,988 in 1874 to £28,596,569 in 1888. It says:—

"The fact that an Australasian buys £8 a head of our manufactures, and a Canadian £2; while a Frenchman buys 9s 3d. a head, and a German 8s. 4d., explains much of the interest now directed to our relations with the Colonies. This is the commercial view of the question. It may sound too utilitarian and materialistic to those who rely mainly upon sentiment to develop some scheme of Imperial Federation. It is nevertheless the fact which comes most closely home to us. The Colonies are our best customers, the shipper argues. Any movement in favor of federation can do no harm to business; it will, if it does anything, develop and strengthen it. Hence the development of the Colonies and the establishing of new colonies and spheres of British influence are encouraged by merchants; but it is at the same time satisfactory to know that even if the political machinery which unites the Colonies to the Mother Country were swept out of existence they would still be as good customers as they have ever been. They buy of us because the goods we have suit their tastes, they are reasonably priced, and of a quality which commends further business. It is this fact which lies at the bottom of the indifference sometimes complained of—the apathy with which merchants and manufacturers regard schemes of federation or corporate bodies and societies which shall do that which can only be done by good work and ingenuity in our factories, and enterprise and energy among our merchants."

The above figures show that the import trade of the Kingdom with the Possessions within the period named increased £4,752 899, and the export trade £3,514,830, a total of £8,267,729; while in the same time, while the import trade of the Kingdom with foreign countries increased only £12,800,143, the export trade decreased £13,280,058; leaving a balance against the Kingdom of £479,915. In other words while the import and export trade with the Possessions increased £8,267,729, the import and export trade with foreign countries actually decreased £479,915.

From these facts, according to our contemporary, British manufacturers and merchants are looking more to British Colonial connections throughout the world, and to the establishing of new colonies for markets for their products, rather than to retaining or obtaining the markets of foreign nations. But it is doubted if "the political machinery which unites the Colonies with the Mother Country were swept out of existence" the Colonies "would still be as good customers as they have ever been." No doubt they would give the preference to British manufactures as long as such merchandise was to be bought abroad, all other considerations being equal, but the fact that the Canadian consumption of British manufactures is but £2 per capita, while it is £8 in Australasia, suggests that, seeing that Canada is quite as prosperous as Australasia and consumes quite as much manufactured goods, under our National Policy we are becoming independent of the Mother Country in the production of manufactures; even as Germany and France have become virtually independent of her through the operations of their tariff laws. The reason why Australasia consumes £8 per capita of British manufactures is because that country, not having encouraged manufactures of its own by the imposition of a protective tariff, has no such industries to supply its wants; and the reason why Germany consumes but 8s. 4d. per capita of British manufactures is because, under her protective tariff, the home production is equal to the demand. The general tendency of the times is towards national protection of home industries; and the belief is entertained quite extensively, both in Great Britain and in the Colonies also, that if British merchants and manufacturers regard with apathy the schemes of Imperial Federation now being discussed, and allow the coldness of their indifference to freeze out the efforts that are being made in that direction, it will warm up the

desires of the protectionists in the Colonies to a point where the example of Canada will be followed in the imposition of a tariff that will exclude their merchandise from Colonial consumption even as it is being excluded from the consumption of foreign nations.

THE NEW ENGLAND IRON INDUSTRY.

A FEW days ago the New England manufacturers of iron and steel goods presented a petition to their Senators and Representatives in the United States Congress, praying for the removal of the duties on coal, coke, pig iron and iron ore; and this is the way two Toronto daily papers view the matter. Says the *Mail:*

The subject is one of very considerable importance to Canada, for undoubtedly our iron and coal interests would be benefited were their products admitted free to the United States market. The New England men are suffering from the competition of Pennsylvania as well as from that of the Southern States, where great strides have been made of late in the development of the iron industry. Neither coal nor iron is found in New England proper, so that the iron and steel mills have to purchase their raw material from the competing States. In this emergency the New Englanders look to Nova Scotia. Their petition appears to be a formidable one, full of reason and truth; but it is extremely doubtful if the Republican party can be prevailed upon to make such a radical modification of the Protectionist system as the signatories demand. New England would occupy a more logical and, therefore, a stronger position were she willing to surrender the protection which she enjoys on her manufactures of iron and steel. Nobody has much sympathy for a manufacturer who wants the duties on somebody else's productions repealed whilst standing out for a heaping measure of pro ection to his own.

And this from the *Empire:*

That the manufacturers of New England using iron and steel are petitioning Congress for free iron, coal and coke, is instanced by one of their Canadian organs as telling against protection. The truth is that the protective policy of the United States has so built up their industries far and wide that the Yankees no longer manufacture, as was once the case, for the whole country, and find that their output cannot easily be absorbed. They think they would have a better chance with their new competitors if they could escape the duties on their raw materials, which, by the-bye, are not protective, but war taxes, surviving after the need. But what the Yankee manufacturers really desire most is access to our markets, that with their surplus output they may crush and supplant our Canadian industries.

An explanation of who these manufacturers are, the lines of goods they manufacture, and what they desire is in order. Generally they are foundrymen, shovel makers, machinists, nail makers and other consumers of the so-called "raw" materials regarding which they ask legislation. There are 122 names signed to the petition, and these embrace manufacturers of skates, skiving machines, bedstead fasteners, steel shanks and similar small wares. The petition is not addressed to the Congress, nor to either branch of it, or to any committee thereof, but "To the Senators and Representatives in Congress of the New England States." Their requests are: First, That iron ore, coal and coke shall be put upon the free list, as they were before the war. Secondly, That the duty upon pig iron and scrap iron and scrap steel which prevailed immediately before the war be restored: to wit, a duty of 24 per cent. *ad valorem.*

Regarding these materials: there are thirteen blast furnaces in New England, and these are the almost exclusive consumers of iron ore, not more than three per cent. of all the ore consumed in New England being used in other manufactures; yet it is a singular fact that the name of no blast furnace owner is signed to the petition, and the conclusion is irresistible that New England blast furnace men are opposed to free iron ore. There are no blast furnaces near the city of Boston, yet all the iron ore imported into New England in 1888, which amounted to only 410 tons, was entered at that port; but as there are rolling mills in and near that city in which small quantities of iron ore are used, it is presumed that all this 410 tons was consumed in them. No blast furnace in New England uses coke fuel, therefore no blast furnace man there is interested in removing the duty from coke; but all of the signers of the petition are consumers of coke and coal fuel. The president of the Tyler Steel Tube Works, of Boston, one of the largest concerns of the kind in New England, and a large consumer of fuel, states that Nova Scotia coal is not adapted to his business, and that if it could be laid down in his works at one-third the cost of American coal he would not use it; it contains too much sulphur, and is absolutely valueless for steel or iron manufacture. Regarding coke from the Maritime Provinces: instead of coke from there being in demand in New England, Mr. J. M. Schoonmaker, of Pittsburgh, Pa., a large manufacturer of coke, states that he had tried the experiment of exporting his coke to Nova Scotia, where there was a demand for the article, but that the circumstances were against the success of the trade. He says that his shipments had been satisfactory, but the cost of transportation made the business impracticable; and that the Nova Scotia consumers preferred to use English coke. The records do not show that any Nova Scotia or any other foreign coke had been imported into New England for years. During 1888 the importations of foreign bituminous coal into New England aggregated but 74,075 tons, nearly all of which was probably consumed in making steam and not in the manufacture of iron and steel.

Mr. James M. Swank, in the *Bulletin*, discussing this petition, alluding to the duty on pig iron and scrap iron and steel, says:—

First, the products of the signers to the petition are protected in the present tariff by duties averaging not less than 50 per cent. Mr. Tobey's nails are protected by a duty which has averaged in late years about 60 per cent., and which is prohibitory. Second, the signers to the petition do not recommend or even hint at a reduction in the duties on their own products, and we hazard nothing in saying that not one of them would agree to accept the same rate of 24 per cent. that they magnanimously propose shall be imposed on pig iron and on scrap iron and scrap steel. Third, a reduction to 24 per cent. in the duty on the raw materials just mentioned would not only injuriously affect the immense pig-iron industry of the whole Union, and every industry dependent upon it, by greatly facilitating the importation of foreign pig iron, but it would surely close every one of the existing thirteen blast furnaces in New England. All these furnaces use charcoal, the most expensive of all furnace fuels, and they would be among the first to put out their fires as a result of the Swedish, English and Scotch competition which the signers to the petition invite. To help themselves to cheaper pig iron of foreign manufacture these 122 signers, who deplore with tears in their eyes the decline of the New England iron and steel industries

in late years, would actually stab to death the pig-iron industry of their own section.

If the blast furnace owners of New England do not want iron ore to be made free of duty, and if the coal and coke of Nova Scotia are as inferior to American coal and coke as has been shown, we submit that the inference is not only justifiable but irresistible that the real objective point of most of the 122 signers to the New England petition is cheap foreign pig iron for their foundries, machine shops and other establishments which use pig iron. By reducing the pig-iron duty from $6.72 to 24 per cent. of the foreign value (equal to an average during the past few years of about $2 50 per ton), they would hope to save about $4 a ton on this raw material. How much they would injure the pig-iron industry of New England we have already stated. How much they would injure the pig iron industry of the whole country and the iron-ore, coal, coke, transportation and other industries which are dependent upon it, we have the charity to suppose they have not stopped to consider.

Such is this petition when it is calmly and dispassionately analyzed. We do not believe that it will have any influence upon the New England Congressmen to whom it is addressed, but if it should have then New England must face the logical consequences—"With what measure ye mete it shall be measured to you again." It is not possible to put some so-called raw materials in the free list and to greatly reduce the duties on others without precipitating unfriendly legislation along the whole line of finished products. The opposite and conflicting policies of Protection and Free Trade can not both prevail in this country side by side. We must have either the one or the other.

When it is remembered that the Protectionists in the American Congress are in the majority in both branches, this New England Free Trade side wind will probably not influence any tariff changes in that direction.

The *Empire* fails to grasp the situation or to comprehend the fact that New England is but a fraction of the United States, and that these 122 concerns there do not and cannot manufacture more than one per cent. of the output of the whole country in the lines in which they are engaged; and it prejudices the cause of Protection in this country in its attacks upon the American tariff. Without doubt American Protectionists in and out of Congress should be allowed to attend to the details of their tariff without impertinent suggestions from the *Empire*. The *Mail* states the case correctly when it says: "Nobody has sympathy for a manufacturer who wants the duties on somebody else's productions repealed whilst standing out for a heaping measure of protection to his own;" but its allusion to what the logic of New England should be, should be restated so as to read: "New England would occupy a more logical, and therefore a stronger position were she willing to accept in good grace and faith the protection which she now enjoys on her manufactures of iron and steel."

EDITORIAL NOTES.

Mr. Frederic Nicholls, manager of the Toronto Incandescent Electric Light Company, on invitation, delivered an address last week before the Canadian Association of Marine Engineers, in Shaftesbury Hall, this city, on "The Dynamo Electric Machine, and the Electric Motor."

The tariff of the Dominion is not, we presume, like the laws of the Medes and Persians. It can be changed, and when the people of Canada see that any considerable general advantage is to be gained by revising it, it will be revised.—Victoria, B.C., *Colonist.*

The *Empire* speaks of "the minority-elected President Harrison." This and many other similar utterances might lead one to imagine that the *Empire* had been subsidized by the Democratic party in the United States to fight the Republican party for them—to be a sort of a bushwhacker, as it were. Mr. Harrison was elected according to law, and was inaugurated President of the United States without protest or objection.

The owners of tin mines in South Dakota will ask Congress to put a duty on that metal in order to protect them against the low paid labor in Cornwall. The miners in Dakota are paid $2.50 and above a day, whereas the Cornishmen get but seventy-five cents a day. Tin mining is as yet an infant industry in the United States but promises to become one of the leading products of the West. It can ask for protection on both grounds.

During the fearful storms that swept along the Atlantic coast in January, a boulder of basalt rock weighing sixty-two pounds was thrown by the force of the waves to the roof of the house of the lighthouse-keeper at Tillamook Rock, on the coast of Maine, 110 feet above the sea level. The water poured down the chimney of the fog signal and poured out through the tubes in the boiler in streams, and spray came down over the lamp chimney, 150 feet above the sea level, and poured down to the bottom of the lighthouse inside.

Mr. Thomas A. Edison has perfected a machine which separates iron from ore. The device is a model of ingenuity and simplicity. It consists of a crib surmounted by an iron hopper. Beneath the latter, a system of magnets is arranged so placed on the side of the crib that as the crushed ore filters through the hopper the tailings fall directly to the bottom without being diverted from their course, while the iron, on the other hand, is attracted to one side and caught in a pan. A number of these machines are in successful operation at iron mines in New Jersey and elsewhere.

In our last issue, among our "Manufacturing" notes, it was stated that there are now twenty-four factories of different kinds in operation in the busy town of Brantford, Ont., giving employment to 2,250 hands and that the total value of goods shipped from these factories last year aggregated $100,000. Mr. Osborne, the President of the Brantford Board of Trade, informs us that this figure is wrong. He says that the exports of manufactures from Brantford factories last year were valued at $100,000, but that the value of the total output of them reached to between $3,000,000 and $4,000,000.

The Toronto *Mail* quotes the fact that during the year 1888 the exports to Brazil from the United States were only $7,137,000, while the imports from Brazil were over $53,000,000, and that England contributed forty per cent. of Brazil's imports, and the United States only from seven to eight per cent But the *Mail* fails to tell of the inconsistency of the Free

Trade argument that if trade with another nation is to be desired, it must buy from that nation what it has to sell. The United States bought nearly eight times the value of goods from Brazil than Brazil bought from the United States.

THE American Window Glass Importers' Association, including representatives of every glass importing firm in the country, met in Springfield, Mass., a few days ago, and advanced the price of window glass This advance is attributed to an increase of twenty to forty per cent. in the price of glass in Europe and to the advance made by the American window glass manufacturers. Of course Free Traders will attribute this advance to the pernicious effects of Protection, while the real cause is the advanced pay of workmen. Certainly the forty per cent. advance in Europe cannot be charged to the American tariff.

THE experiments that were made in California last year in the cultivation of the sugar beet and its manufacture into sugar were entirely successful. In the neighborhood of Watsonville, that State, 2,000 acres of land were cultivated to beets, from which 13,500 tons were gathered, from which 1,650 tons of sugar were extracted. The average price of five dollars a ton was paid for the beets at the Watsonville factory, and the time of operating the factory in extracting the sugar was forty seven days. The farmers are satisfied that they can raise the beet at a good profit, the probability being that the acreage will be doubled the coming season.

THE Free Traders of France propose to let the Protectionists have full swing in the matter of increasing the tariff duties, confident that the experiment will result in failure. Give Protectionists plenty of rope and they will hang themselves.—*Montreal Herald.*

The Free Traders of Canada will have to do just what the Free Traders of France have done—let them have full swing, confident that Protection will result in as unbounded success in Canada as it has in the United States, France and Germany. Yes, give them plenty of rope and they will hang Canada high in the galaxy of great and glorious nations that have achieved industrial greatness through the manufacture in Canada of all the country requires. "The nation that manufactures for itself prospers."

ASSUMING, says the Boston *Herald*, that a community of 100,000 workers can produce in a day, by the labor of ten hours, wealth to the value of $300,000, then if their labor is cut down to eight hours a day, they must either work harder or more skilfully in the shorter period or there will be one-fifth less of wealth to divide among those interested in its production. There is no way of getting over this. At the present time the wage earned is paid, and the capitalist receives his returns from the gross sum of production. If this sum is cut down in any way, a loss is inevitable either on the side of the capitalist or the wage earner, or on both sides. While $5 divided among five men will give each $1 there is no no process of arithmetic by which $4 divided among five men will produce the same result.

A BLUE book has just been issued by the British Government dealing with the expenditures of working men in different parts of the country. "The classes of workmen included in the returns," says the London *Times*, "are very various, and come from all parts of England and from one or two places in Scotland. Miners, joiners, engineers, shoemakers, printers, agricultural laborers, clerks—all these groups, and others, are put under contribution. The total wages vary from £28 12s. to £150 per annum, and it is somewhat curious to notice that those of the agricultural laborers when the full receipts of the year come to be added up are not the lowest. Thus the yearly incomes of the families of the two Kentish laborers given are £50 and £42, whereas those of three Northumberland miners are as low as £29, £32 and £33."

THE *Globe* reminds one of the jackass that attempted to drive away an annoying fly from its ear by fanning it with its hind foot, while at the same time it was attempting to express its admiration of its surroundings by braying a few half-forgotten stanzas of Old Hundred. It opened its mouth and put its foot into it. The parallel incident of the *Globe's* is wherein, in commenting upon the recent Hull riots, it suggests that "an effective way to guard against similar occurrences in the future might be found in the creation of a moveable body of police, stationed at a central point, that could be quickly dispatched to any place where their services were needed. Such a force would prove of value in quieting disturbances of any kind." In other words the *Globe* wants to see organized and established in Canada a standing army such as is maintained in despotic countries for such purposes as that indicated, or battalions of Pinkerton detectives armed with Winchester rifles such as now exist in the United States.

THERE are stated to be 347 women blacksmiths in England, who swing heavy hammers, and nearly 10,000 employed in nail making.—*Toronto Globe.*

The *Globe* wants Canada to abandon Protection and adopt Free Trade. England has Free Trade. Women do not work at blacksmithing and nail making in Canada, and swing heavy hammers. In England they do. In England the women enjoy "woman's rights" to the fullest extent—the right to do the coarsest and most laborious work, such as only strong men should perform, or starve. In Canada women only perform women's work. Blacksmith's work and nails, done and made by women, are cheaper in England than in Canada, but this is made possible by the fact that women are employed in the trade at starvation wages. Food products are not as cheap in England as in Canada; and Canadian workmen, because they receive higher wages than English workmen, live better than they do, and have more money wherewith to pay for their living. The depressed condition of English workmen is owing to Free Trade prevailing there, by which their labor is brought into competition with other workmen who are even more depressed. The Canadian tariff protects Canadian workmen from all such competition.

DOMESTIC (Lancaster) ginghams under the tariff of 1846 sold at wholesale in New York at eleven and a half and twelve and a half cents per yard, and to-day, under a duty that is prohibitive, they are as plenty as autumn leaves at six and a half cents. Standard sixty-four by sixty-four prints under the "Free Trade tariff" of 1846 were worth in the same market

eight and a half to nine and a half cents. To-day they are abundant at five and a half to six and a half cents. All kinds of silk goods, subject to a duty of fifty per cent, are very much lower in price than the same goods were when the duty was only nineteen per cent. *ad valorem*. All kinds of crockery, although the duty is fifty-five and sixty per cent. to-day, are very much cheaper than under the old revenue tariff of twenty-four per cent. All kinds of hardware, tools, locks, screws, building hardware of all descriptions, all kinds of saws, planes, etc., are all highly protected, but all cheaper than ever before known. Here is a good and plain tariff creed that every one can comprehend: On everything that we can make successfully and cheaply here, and in ample supply for the wants of the people, make the tariff decidedly Protective; all goods that can not be successfully manufactured or grown here, and in ample supply for the wants of the country, put upon the free list.—*The Bulletin.*

THE London *Advertiser* speaking of the acquisition by British capitalists of the extensive mining machinery plant of a Chicago concern, who are said to be the largest manufacturers in the world of that class of machinery, says: "In this way Great Britain is gradually repossessing the American continent." The price at which this concern sold out is nearly three million dollars, and the business is to be continued under the old management; it also being the intention of the new organization to erect an extensive branch establishment in England, where they will manufacture for the foreign trade, leaving the Chicago works to supply the United States and Canadian markets. It looks rather that the American manufacturers, using British capital, are about possessing themselves not only of Britain, but also of all the rest of the world where mining machinery is required. It is evident that these British capitalists have no faith in the excellence of British mining machinery, and have unbounded faith in American machinery, and are showing this faith by the works they propose establishing in their own country, operated by Americans and American methods. Our American friends are perfectly willing to let this "repossessing" business go on. British capital invested in American industrial works will give employment to American labor.

ONE of the clauses of the Customs Administration Bill now before the United States Senate Committee on Finance imposes very heavy penalties on persons convicted of bribing customs officers to do anything contrary to law in connection with the importation, appraisement, entry examinations, or inspection of goods, wares, or merchandise. New York importers now at Washington state that if this clause becomes law, every chance the Republicans may have had of carrying New York will be destroyed. It is also stated that one large importing firm in New York employs a former government official, at a salary of $15,000 a year, for the purpose of "fixing" revenue agents, and that this man is now in Washington with the view of securing the defeat of the "burdensome" clause. A protective tariff is a glorious thing.—*Mail.*

The tariff is indeed a "glorious thing" in protecting the home manufacturer against the pauper labor of foreign countries. The *Mail* sneers at the efforts of the United States Government to prevent the bribing of customs officers to do things contrary to law in connection with the importation of foreign goods, and it evidently thinks that the suggestion of Republican failure to carry New York in the next election, if this stoppage of frauds on the customs is suppressed, will secure the defeat of the measure. The Republicans made the tariff and they will see to it that its provisions are not defeated. What Canada needs is a similar law.

WHATEVER influence may be exerted by the tariff is in favor of the farmer, not against him. Because the tariff permits so many persons to engage in manufacturing industry the farmer has a larger home market than he would otherwise have for his products. The milk product of the United States is probably worth as much as the total iron product, possibly more, and it is all sold at home. So with the total vegetable crop, much of the fruit crop, all of the berry and melon crop, and a very large share of the egg crop. Many of these things will not bear transportation; but they represent solid wealth; and they are sold by farmers to people who are not farmers because the protective system has diversified industry. What is needed for the farmer is not (what Free Trade will give him,) a smaller home market and more home competition, but such diversification of his products that the home market will take all he produces and make him independnt of foreign purchasers. Clearly the only method by which this end can be attained is, first, by multiplying industries other than that of agriculture, and, second by stimulating industries like beet sugar manufacture, which will require farmers to stop growing things now produced in excess, and to turn attention to the growing of articles not now produced at all. But protection at the sea-board is the absolute essential of any such undertaking.—*The Manufacturer.*

OUR American neighbors seem determined to produce within their own territory all the sugar they require. But a small proportion of that territory is adapted to the cultivation of sugar cane, but the growing of that article and its manufacture into raw sugar is the principal industry in Louisiana. For several years there have been persistent and organized efforts in Kansas and other Western States to manufacture sugar from sorghum, and allusions have been frequently made in these pages to the beet sugar industry in California. Similar efforts are being made in Iowa, and all these interests combine to influence Federal legislation in protecting the industry by continuing the duties upon importations of foreign sugar. The beet sugar industry is exciting much attention among farmers and others from the fact that the crop is easily cultivated and harvested, and that it yields remunerative returns. A sugar works company in Iowa have obtained 27,600 pounds of sugar beets per acre, yielding nearly 2,300 pounds of sugar of a high grade. At five cents a pound the value of the product was about $115 per acre. This was an experimental test, and no doubt the yield of beets per acre could be considerably increased, while the cost of manufacturing would be reduced. Experiments made in Canada last year demonstrated that the soil and climate of this country are well adapted to the cultivation of the sugar beet; and there are reasons to hope that, in a few years, under our N. P., Canada will produce all the sugar she requires.

AN ounce of facts is worth a ton of argument. Mr. A. M. Garland, of Illinois, contrasts these values as follows:

Just now the advocate of free foreign trade finds it especially difficult to uphold the claim that a protective tariff is a tax to be paid by those who buy the products of the protected industry. The facts stand out in contradiction of his theory in figures so plain than he who runs can read them. With steel rails, on which there is a tariff of $17 per ton, selling at the same price in the United States as in England; while United States manufacturers, notwithstanding their protection by a tariff averaging forty per cent., are selling to Canada eighty per cent. of her hardware and machinery; with a suit of good, serviceable clothes selling as low in Chicago or New York as in London, notwithstanding the tariff on woolens equal to fifty per cent. *ad valorem*; with some lines of cotton goods selling for no more than the tariff charged on similar imported fabrics; with an export trade of more than $23,000,000 worth of lumber and manufactures from wood in 1888, notwithstanding the $2 per thousand feet tariff on the former and thirty-five per cent. on the latter; with all these there comes an array of facts beside which the threadbare speculations of the theorist seems as but a hill of sand. While every line of business is furnishing such facts as these, what becomes of a prominent reform apostle's contention that our tariff enhances "prices to consumers of articles imported and subject to duty by precisely the sum paid for such duties?" In 1889 we imported more than $20,000,000 value of iron and steel manufactures, not including tinplates, which we do not manufacture. With prices so nearly equal here and in Europe, who believes that these could have been bought for forty per cent. less money in the absence of the tariff? It would require very little more credulity to believe that in the absence of a tariff on cotton goods English manufacturers would give us our calicoes.

It is one of the effects of ignorance that reformers will shriek for liberty for self and howl for tyranny to others; with them charity for the human race is entirely lost in self. There never yet was a reformer of this kind that did not, soon or late, fall to the rear forgotten. Even the good deeds of such a man are buried with him. We have heard here in Boston a great outcry demanding the privilege to abuse the public parks. The same reformers would not allow a man of mature age to work over ten hours per day if he wanted to. They want liberty for self, and liberty to oppress others. They will allow their wives the privilege of working fifteen or more hours per day, but then, she is only "my old women." We do not believe there is a labor reformer in the United States that understands the true definition of that glorious word "Liberty" or has a heart big enough to properly define it. Liberty and justice are as important to the millionaire as to the boot black, to the manufacturer as to the operative. The full grown person who is prohibited from working over ten hours per day if he so desires it is a helpless subject of tyranny, and cannot but feel the yoke at times. The true reformer will ask for fewer laws instead of asking for new ones that bear unjustly on others. Man cannot make a perfect law. Nature's laws are all perfect and power cannot make inoperative the smallest of them. We have hoped at times that the labor movement would leave us a few names for the niche of fame. But not being able to grasp their opportunity they settle back one by one from whence they came. There is an army of true reformers in the United States at the present time but their names are unknown. They are sacrificing self in the war against ignorance, and future generations will know that such men once lived.—*Wade's Fibre and Fabric.*

The discussion of the Canadian iron duty is waxing warm across the border. Newspapers of all shades of opinion are taking a hand in it. By far the ablest exponent of the Protection idea is the Canadian Manufacturer, whose columns fairly bristle with argument and repartee. One phase of the question is discussed and the tables are neatly turned on an advocate of reciprocity in the following paragraph from the Manufacturer:

"Mr. T. D. Ledyard says that the rich Bessemer ores of the mines near Peterborough, Ont, can be laid down in American lake ports, duty paid, at about the same cost as Lake Superior ores of equal quality and value; and that gentleman has stated that these Peterborough ores can be laid down in certain American cities at the following prices, duty paid: Buffalo, $3.25 per ton; Pittsburgh, $4.75, and Cleveland, $3.90. According to a late report of the condition of the Cleveland market, as given by *The Iron Trade Review*, the average value of Lake Superior ores in that market was about $6 per ton, the product of the Republic mine being quoted at $7. It is claimed for the Peterborough ores that they are the equal of any produced in the Lake Superior region, and if this is a fact, and if it is a fact that the Peterborough ores can be laid down in Cleveland at less than $4 a ton, duty paid, Mr. Ledyard could do a neat stroke of business by sending the million tons of ore he has in his Peterborough mine, which lies within a hundred feet of the surface, to Cleveland, where he could realize a profit of $3 a ton."

If Mr. Ledyard's figures are correct, viz., that he can lay down his ores in Cleveland at $3.90 per ton, duty paid, he can well afford to pay the paltry duty of seventy-five cents in order to realize a profit of $2.50 to $3 per ton; yet we have not recently heard of any shipments from the Peterborough or any other Canadian mines to any perceptible amount. Something must be wrong somewhere.—*Cleveland Iron Trade Review.*

Washington, Hamilton, Jefferson, Jackson, Webster, Clay, and all other loyal fathers of the earlier days of the nation advocated the policy of building up every industry necessary to the comfort, independence and prosperity of the people by protective legislation. Protection and competition are the main elements in the business lexicon of the United States. Protection builds up home manufactures, and home competition brings the products of the protected industries to the basis of reasonable profit and destroys all attempts at monopoly. This has been the satisfactory result of protection in this nation. The early fathers, whose wisdom laid the business foundations in principles so broad and deep, have been grandly vindicated. Protection to manufacturers, business and labor has done more to develop and sustain the United States than all other elements combined. It is the strong, steadfast anchor which insures prosperity in business and higher wages to labor than are paid in any other country. Great Britain sustains a free trade policy mainly to keep down the wages of her laboring people, in order that the crafty Britons may have the whole world for a market for her goods, and yet England does not hesitate to apply the protective system wherever the interests of her mercantile marine demands it! The wage-earners interests are mainly considered in the legislation of Great Britain in divising ways and means by which cheap labor can be maintained. This policy ought to be sufficient indication to all laboring men that free trade is the greatest danger which has ever threatened their interests. Full knowledge of the condition of the wage-earners of England, under free trade

regulation, is all that should be necessary to convince all laboring men that the protective principal is their only safety and the only hope of the continued prosperity of the whole nation. Labor and business can only prosper in like degree under protection. Free trade has no inducements of increased remuneration for labor.—*Iowa State Register.*

THERE is no modern field of science that has been so extensively invaded, prosecuted and cultivated all at one time as photography. Its very nature would warrant this for it professes, and in these days actually does catch and place before us all the beauties of mountain and valley, forest and plain and river. If the camera could only catch the glories of color now as well as light, shadow and expression we should no doubt have attained the very acme of perfection in photography. That, however, is a discovery yet to be made. Amateurs have done as much, perhaps more than professionals, to develop photography. Wealthy men have taken to it as a pastime, and have burdened themselves with cumbersome apparatus to carry on their very costly amusement. Then the schoolboy and the student have been caught with the craze of carrying around a box and tripod, and taking every opportunity of diving under that black rag. Now this is all changed; science, art and ingenuity have altogether metamorphosed photography in many directions. The kodak camera is the latest addition. The discovery of transparent films greatly facilitated matters in producing these cameras, before the days of which it was necessary in order to have sufficient material for making 100 negatives to carry about nearly 50 lbs. This is now reduced to such an extraordinary degree that one and a half pounds provides enough ammunition for 100 views; and not alone in weight, but also in bulk the reduction is made, the kodak being really a magazine camera of small compass, loaded at one operation for 100 photographs. All that is necessary to "fire" them being the pulling of a string and the pressing of a button; and a turn of the thumbscrew places a fresh surface of film in position for the next shot. A recent lecturer pointed out the case with which unexcelled negatives can be taken with these cameras. This branch of photography (namely instantaneous photography with the magnesium light, a flash of which is sufficient to give a fully timed negative) is of comparatively recent introduction.

HAVE the Lake Superior copper and iron producers awakened to the fact that there is an organized movement, managed by such adroit diplomats as Mr. S. J. Ritchie, of Akron, O., promoter of the Canadian Copper Company and the Anglo American Iron Company, and supported by such protective authorities as Senator John Sherman and Representative Butterworth, looking to the abolition of the duties not only on these ores, but also those on nickel and sulphur as well? In an elaborate argument before the House Committee on Ways and Means, recently, Mr. Ritchie stated that the object of the movement was to enable the above companies to smelt their ores at Findlay, Ohio, where cheap fuel could be obtained. To transfer their smelting works to this side, say to Findlay, said Mr. Ritchie, would require the erection of a very extensive plant, the expenditure of a large amount of capital and the employment of a great number of men, and, unless these ores are admitted free, he claimed, all this expenditure of capital and employment of men must be done in Canada and the product go to foreign governments. The Dominion Government remits the duty on American machinery which they send in to work their mines. It also remits the duty on coke which they use for fuel. It also offers quite a large bonus per ton for the manufacture of iron and steel from this material. Every stockholder in these companies, he added, is a citizen of the state of Ohio; every dollar invested in them is Ohio capital, and, in making this request, the petitioners only ask that Congress treat our own citizens and our own capital as fairly and as liberally as the Canadian Government has treated foreigners, who are American citizens. In support of his position Mr. Ritchie presented a letter from Senator Sherman, in which he said, refering to the question of closer commercial relations with Canada: "My own opinion, frequently expressed, is that the better way is by concurrent legislation of the two powers. Canada is invested by the Mother Country with full authority to pass tariff laws and commercial regulations. Congress could, by law, provide that Canadian fish, coal, coke, lumber and iron and other metallic ores be admitted free of duty, whenever the Dominion authorities should admit free of duty the chief articles of our productions consumed in Canada, and give to our fishing vessels commercial rights to the full extent allowed by both countries to ordinary commercial vessels." Representative Butterworth's argument was much in the same line. We have given these extracts from the arguments put forward, not as endorsing them, but rather as showing that, if the iron and copper producers of Lake Superior consider the present tariff as any protection to them against Canadian competition, now is the time to act.—Cleveland, Ohio, *Iron Trade Review.*

SPECIAL ADVERTISEMENTS.

Advertisements will be accepted for this location at the rate of two cents a word for the first insertion, and one cent for each subsequent insertion.

THE William Johnson Company, Montreal, have sent us a beautiful chromo lithograph hanging office calendar for 1890, a very attractive part of which consists in a display of a few of the shades of Johnson's liquid colors, artistically arranged.

THE *Philadelphia Carpet Trade*, one of the most expensively got up trade journals published, after having passed through seven years of prosperous and useful existence, begins its eighth year with a new departure and a new, enlarged and more comprehensive name —*The American Carpet and Upholstery Trade.* In its previous career it has never we are informed, had a day's sickness, and its condition is now more lusty than at any former period. The change means new features, larger outlays of money, careful reporting and an unswerving adherence to the highest standards of trade journalism.

THE Dominion Dye Wood and Chemical Company, Toronto, have sent us an elegant accessory for the writing desk—a blotter consisting of a number of vari-colored blotting pads bound in book form with stiff muslin cover, upon the front of which is the legend in gilt letters: "Compliments of the Dominion Dye Wood and Chemical Company." The inside of the front cover contains a calendar for 1890 and a part of 1891; and on every page is interesting reading matter having reference to the business of the company. The book is of size sufficient to enclose commercial sizes of letter paper.

NELLIE PATTERSON, of Mount Carmel, is the only woman machinist in Connecticut. She is a handsome girl, bright-eyed, quick in action and very popular. She is employed by the Mount Carmel Belt Company, and is a full-fledged machinist, having served her full time at the trade and mastered it in all its details. Miss Patterson can block up a piece of work on a planer or turn up an arbor or any other product of a lathe as well as any man in the employ of the Company. She earns a man's wages and is in love with her work. At first she had to meet with jealousy from her fellow-workers, but her pleasant ways have made her a general favorite.

HE who invests in a Webster's Unabridged Dictionary does a wise thing. If he is a man of business he has close at hand an encyclopedia of knowledge that cannot but be invaluable to him under any circumstances, but particularly so when business pressure denies him the time to make more exhaustive search for the desired information. This is equally true regarding the professions, where not only elegance of diction but absolute correctness of expression is essential; and to him who has a family of advancing children no greater service could be rendered them than having an Unabridged Dictionary at their constant service. This work is the standard authority in the Government and other important printing offices, in public schools and colleges, and wherever the English language is spoken.

THE bright young folk's weekly, *Santa Claus*, published in Philadelphia, has hit upon a decided novelty in the way of prize competitions. Twenty-two boys and girls, all prize-winners, will spend a day in Washington, as the guests of *Santa Claus*, leaving Philadelphia in a private Pullman car on the morning of Wednesday, Feb. 26th, and returning the same evening. The party will see Congress in session, visit the Departments, the Smithsonian Institute and the National Museum, go to the top of the Washington Monument, be received by the President, and take dinner at one of the principal hotels. A number of well-known Philadelphia ladies will accompany the party as patronesses. *Santa Claus* is one of the most delightful magazines in the country, and the price of it—$2 a year—places it within the reach of all enterprising children. Address The Santa Claus Company, 1113 Market Street, Philadelphia, Pa.

THE naturalist, the progressive farmer and all intelligent and thinking persons will be interested in the series of six articles on the study of insects to be begun in the *New York Ledger* of March 1st. The series is by Professor John H. Comstock, of Cornell University, the eminent naturalist, and will describe the insect pests which annually injure the fruit and vegetable crops of the country to the extent of $100,000,000. Particular attention is given to the pests which ravage cotton, rice and grain fields and orchards, gardens and vineyards. Professor Comstock shows that the cotton worm of the South has been responsible for an average loss yearly of $30,000,000 to the cotton crop. He considers the terrible devastations of certain insects, such as the locust in the West, the potato beetle and the cotton worm, have been blessings in disguise, as they have shown the possible powers of those once despised creatures, and have occupied the attention of the leading scientists of the world to such an extent, that growers may reasonably hope that the ravages of the insects mentioned may be confined within certain bounds. Professor Comstock also treats of insects useful to the farmer. His articles are of the greatest value.

THERE is no problem of greater interest to ship-builders and owners along the Atlantic coast, just now, than that of devising a safe and otherwise satisfactory rig for the big four-masted schooners that have become so fashionable within the past three or four years. Instead of the long, thick, heavy spar rising from the midship line, it is proposed to substitute two neat substantial steel trusses. The trusses are to be built of three or four pieces of flat steel set edgewise to the side of the ship, and united by angle irons riveted between them and by tie rods, which would make the truss at once light, stiff and symmetrical. Where the trusses meet at the cross-trees they would be riveted to a stiff steel cylinder, in which the topmast would be stepped. From the heel of this topmast, or from the steel cylinder in which it was stepped would be stretched a steel rope, the lower end of which would be set up in a stout eye-bolt set into a deck beam. The sail could be secured to this perpendicular stay by clips, just as the yacht jibs are secured to a jib-stay. The boom and gaff would swing on metal collars put around the rope. The sail would swing to and fro as readily as it now does. The steel rope on which it swung, if of proper size, would stand a much greater strain than any wooden mast. Further to strengthen the trusses that at once replace mast and shrouds, cross plates and tie-rods could be run from truss to truss, but if the truss-plates were made of suitable size, and the size could be easily calculated, these long tie rods would not be necessary.

THE B. Greening Wire Company, Hamilton, Ont., have sent us their January, 1890, catalogue and price list of wire cloth, perforated metals, etc., manufactured by them The first article referred to is their Brown's patent steel wire chain, the Canadian patent for which they now control, and which chain was described in our last issue. A page is given to a table of the size, weight, length and strength of iron wire. Then the size on wire gauge being given of any wire, the table shows the diameter in inches, sectional area in inches, the weight of a hundred yards and of a mile, the length of a hundred pounds, and the breaking strains of both annealed and bright wire. Another page gives an illustrated comparison of dimensions of different sizes of wire expressed in fractions of an inch, and in Imperial and Birmingham wire gauges. Other pages are devoted to illustrations and descriptions of the different styles of perforated sheet metal manufactured by this company for clover mills, fanning mills, threshing machines, and all grain cleaning machinery, malt and oat kiln floors,, woolen mills, etc. The wire cloth department has reference to the cloth made for locomotive smoke stacks, malt and oat kiln floors, cotton and wood dryers, coal and mining screens, etc. The catalogue contains an eight page inset having reference to the wire lathing made by the Greening Company. This article is made in several styles, and we are informed that quite a large number of large and expensive buildings erected, and now being erected throughout Canada, are supplied with the metallic lathing manufactured by the B. Greening Wire Company of Hamilton.

THE FOREIGN TRADE OF CANADA.

CANADA sends most of her exports to the United States and Great Britain. These two countries are about on a level as customers of the Dominion. The rest of the world takes less than 10 per cent. of the total, the United States and the United Kingdom from 90 to 95 per cent. annually. It must be said, however, that the Canadian returns of exports to the United States are deficient like our own exhibits of forwardings to the Dominion. On this side of the line no effort is made to get the figures; on the other side the efforts are not careful.

The following statement shows the exports of Canadian products to the United States and Great Britain respectively by classes in the fiscal year of 1889:

EXPORTS OF CANADIAN PRODUCTS, 1889.

	TO THE UNITED STATES.	TO GREAT BRITAIN.
Products of the mines	$3,753,361	$422,355
Products of the fisheries	2,893,980	1,249,928
Products of the forests	11,043,023	10,197,592
Animals and their products	7,137,205	16,227,060
Agricultural products	9,125,707	3,674,055
Manufactures	1,822,948	1,679,359
Miscellaneous	727,273	53,995
Totals	36,503,297	33,504,344

Comparing 1888 with 1889, the exports of domestic merchandise from Canada to this country and the United Kingdom were as under:

EXPORTS CANADIAN PRODUCTS, TWO YEARS.

	1888.	1889.
To United States	$37,323,161	$36,449,288
To Great Britain	33,648,284	33,504,281

In 1888 the total exports of merchandise, domestic and foreign, from Canada to the United States and Great Britain respectively, and the imports into Canada from those countries, were as follows:

TOTAL EXPORTS AND IMPORTS, 1888.

	EXPORTS TO	IMPORTS FROM
United States	$42,572,065	$55,513,790
Great Britain	40,084,984	39,433,617

The exports to the United States shown in the last statement amounted to 47·20 per cent. of the total exports of the Dominion, and the exports to Great Britain to 44·44 per cent., leaving only 8·36 per cent. of the total Canadian exports for all other parts of the world. In like manner the Dominion imports from the United States stood at 50·06 per cent. and from Great Britain at 35·56 per cent. of the total importations.

The following table shows the principle imports into Canada from the United States and Great Britain respectively in 1888:

PRINCIPAL IMPORTS, 1888.

DUTIABLE.	FROM THE UNITED STATES.	FROM GREAT BRITAIN.
Breadstuffs	$7,413,433	$97,814
Coal and coke	3,576,447	204,105
Cotton and manufactures	761,623	3,326,324
Fancy goods	240,351	1,247,415
Linen goods, etc	31,189	1,304,280
Iron, steel and manufactures	4,107,504	4,339,237
Provisions	21,025	2,339,911
Silk and manufactures	124,818	2,448,075
Wood and manufactures	1,223,772	78,133
Woolen goods	142,370	9,140,940
FREE OF DUTY.		
Anthracite coal	5,287,583	4,292
Hides	1,565,206	35,618
Tobacco	1,441,705	104
Cotton and wool	3,108,431	2,091
Metals and manufactures	596,874	2,507,358
Tea	....	1,218,498
Settlers' effects	1,248,062	409,997
Coin and bullion	2,041,552	131,077

This exhibit gives all the imports from the countries named where the total from either one exceeded $1,000,000. The leading difference between the trade of the two countries with the Dominion is very apparent. By far the larger part of the Dominion imports of cotton, linen, silk, woolen and miscellaneous metal goods comes from Europe. In the exportation of manufactures of iron and steel, however, the United States is, singularly enough, close up to the United Kingdom.

The next table gives the principal domestic exports from the Dominion to the United States and the United Kingdom respectively in 1888:

PRINCIPAL DOMESTIC EXPORTS, 1888.

	TO THE UNITED STATES.	TO GREAT BRITAIN
Coal	$1,411,749	$77,584
Fish	2,393,463	848,016
Lumber	8,091,800	6,430,199
Timber, square	5,537	2,369,281
Horses	2,402,371	36,750
Horned cattle	648,178	4,123,873
Sheep	1,027,410	211,881
Cheese	83,153	8,834,997
Eggs	2,119,582	262
Furs, undressed	281,900	1,699,608
Barley	6,488,317	700
Potatoes	957,570	973
Peas	351,365	1,131,041
Wheat	633,438	1,244,757
Flour	20,172	1,068,139

From this statement, like the first one above, it is apparent that the Canadian exports consist principally of the products of forestry and agriculture in various forms. The shipments of provisions, both to the United States and Great Britain, are important, and also those of breadstuffs. The Dominion export trade with England in live cattle is also very large. The returns for 1889, however, are less satisfactory, so far as the movement of the products of agriculture is concerned, than those for the previous year. The showing in the last table for lumber and square timber is confined strictly to those two classes of products. There was exported in addition to the United States over $1,000,000 worth of masts and spars, shingles, railway ties, stave bolts and shooks.—*Bradstreets.*

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.

MESSRS. MURPHY, GATES & Co., Owen Sound, Ont., are about erecting a saw mill at that place, with capacity to cut 30,000 feet per day.

THE London Printing and Lithographing Company, London, Ont., will be incorporated with a capital stock of $40,000 for the purpose indicated by the name.

THE Canadian Bridge and Iron Company, of Montreal, has been incorporated with a capital stock of $75,000, for manufacturing iron, steel and wood bridges, structural work, etc., and the manufacture of rolled iron and steel.

THE Killey-Beckett Engine Company, Hamilton, Ont., are placing an iron planer in their shop thirty feet long, with a planing capacity of seventy-two inches in width. It is claimed that this is the largest planer in any works in Canada.

THE North-West Coal and Navigation Company will build a new round house and machine shops at Lethbridge, Alberta, N.W.T. The round house will have stalls for twenty locomotives, and the machine shop will be very large and thoroughly equipped.

MR. HIRAM WALKER, of Walkerville, Ont., is president of the company recently formed for the erection of works for the manufacture of malleable iron at that place. The works that are now being erected will cover 420x390 feet, and will give employment to 300 hands.

THE C. Turnbull Company, Galt, Ont., will be incorporated with $50,000 capital stock for the manufacture of knitted and woven woolen goods and yarns. The incorporators will be Messrs. Charles and John G. Turnbull, Galt; Robert Forbes, Guelph, Ont., and James H. and George D. Forbes, Hespeler, Ont.

THE Wilson Manufacturing Company of Hamilton, Ont., are applying for incorporation with a capital stock of $30,000, to manufacture agricultural implements, farm machinery, etc., and to carry on the business of brass and iron founding, etc. The incorporators are Messrs. Matthew Wilson, J. W. Auld, F. M. Willson, Robert Auld and John Wilson.

THE Bushnell Company, Montreal, has been incorporated, with $100,000 capital stock. The objects of the company are to produce crude petroleum, to refine petroleum, to buy and sell petroleum and all its products, and to carry on all the business incidental thereto. It is proposed to carry on the business of manufacturing petroleum at or near London, Ont.

MESSRS. CHOWN & CUNNINGHAM, manufacturers of stoves, ranges, machinery, tinware, agricultural implements, etc., will merge their concern into the Chown & Cunningham Company with a capital stock of $200,000. Messrs. Henry Cunningham, C. D. Chown, Robert Crawford, Richard Wilton and B. M. Britton are to be the first directors of the company.

THE Alliance Manufacturing Company of Toronto are applying for incorporation with a capital stock of $25,000 to manufacture and sell hardware, house furnishings, etc.; and to deal in patents of invention, and to manufacture patented articles. The incorporators are Messrs. G. R. Mortimore, G. C. Mortimore, R. P. B. Joyce, C. W. Conner and J. J. Hocken.

THE Chown & Cunningham Company, Kingston, Ont., manufacturers of stoves, ranges, etc., and who give employment to an average of eighty hands, to whom $30,000 a year are paid in wages, have had an offer from a western Ontario town of a free site for works and exemption from taxation for a term of years, if they will remove thither; and now they want the town of Kingston to "see" them to similar extent as an inducement to remain where they are.

WEST TORONTO JUNCTION, a suburb of this city, is making phenomenal growth as a manufacturing point; a great many industrial establishments from Toronto and elsewhere having already been removed to that place because of the superior advantages offered. Mr. William Medland, whose office is at 28½ Victoria Street, Toronto, is offering for sale a number of factory sites on most

desirable terms and at nominal prices. The land is situated close to the tracks of the Grand Trunk and the Canadian Pacific Railways, and within three minutes walk of the station.

THE Kakabeka Falls Company, whose chief place of business is to be at Kakabeka Falls, in the district of Thunder Bay, Ont., are applying for incorporation with a capital stock of $800,000, to develop and use the water power of Kakabeka Falls on the Kaministiqua river, in the said district for manufacturing purposes; for building and operating reduction, smelting and refining works, etc. The applicants are Messrs. A. P. Boller, New York City; E. D. Smith, A. McGaw and E. V. Douglas, Philadelphia, Pa.; and W. P. Douglas, Minneapolis; all of whom are to be the first directors of the company.

WORK on the Grand Trunk tunnel under the Detroit river at Port Huron is being steadily pushed forward at both ends. The total length of the bore will be 6,800 feet, 2,310 feet under water, 2,160 in the approach on the Canadian side, and 2,330 in that on the Michigan side. About 1,600 feet is so far completed, and the work is progressing at the rate of eighteen feet a day. Canada's river boundaries have been the cause of the construction of several notable engineering works, such as the magnificent bridges at Montreal and Niagara, but this is the first attempt to make a passage for traffic under instead of over them.

THE St. Thomas Car Wheel Company, of St. Thomas, Ont., has been incorporated with a capital stock of $250,000, to manufacture cast iron and steel car wheels, iron and steel castings, to operate machine shops for the manufacture of all tools and equipments used in the operation of iron and steel foundries; and to operate foundries for the manufacture of iron, brass and composition castings, etc. The incorporators are Messrs. P. H. Griffin, car wheel manufacturer, and John Fleming, of Buffalo, N. Y.; T. F. Griffin, car wheel manufacturer, and C. Sheedy, of Detroit, Mich., and T. A. Griffin, car wheel manufacturer, of Chicago, Ill.

MR. JOHN DAVIS, of Messrs. John Davis & Son, Davisville, North Toronto, in a note to this journal speaking of his business, informs us that he first engaged in the manufacture of enamelled earthenware near this city more than forty-seven years ago, and that he has been engaged in it ever since, devoting his time to improving the character and serviceability of his products. His business is in a flourishing condition, having prospered greatly under the National Policy, which Mr. Davis trusts will long be kept in force protecting the smaller home industries, such as his is. The specialties manufactured by Messrs. John Davis & Son include milk pans, crocks, cream pots, butter pots, preserving jars and other varieties of enamelled earthenware; flower pots and saucers, hanging pots and vases, etc.

A NUMBER of manufacturers and capitalists of Toronto and elsewhere have secured a large tract of land at Mimico, a few miles west of Toronto, bordering on the shore of Lake Ontario, where they propose to build a new manufacturing centre. The land embraces about 600 acres, and the capital stock of the company has been fixed at $500,000. Already about ten manufacturers who desire to erect works on the land have taken $300,000 of the stock, and the Grand Trunk Railway Company have promised to runspur tracks through the site, and sidings to each factory requiring them; and there will be wharves and docks built out into deep water to enable any vessel traversing the lakes to receive and discharge cargo at them. Gas and water will be provided, and a complete system of drainage, and in the summer months communication with Toronto will be maintained by a line of ferry steamers. The company is composed of James Morrison, brass founder; T. McDonald, proprietor of the Queen City Stamping Works; Keith & Fitzsimmons, brass founders and chandelier manufacturers; P. J. McNally, of the Toronto Lead & Color Company; Joseph Barrett, sash and door manufacturer; Arthur Kitson, gas generator, Philadelphia, and several others. Preparations are now being made for the construction of the new suburban factory buildings. The erection of factories will commence at once, as plans are ready and tenders will be asked immediately.

SPEAKING of the wonderful mineral wealth in Cape Breton, Rev. Dr. Sutherland says:—"Lower Mira contains one of the most extensive brick clay deposits in the world I suppose. It is of very fine quality, and seemingly inexhaustible. It has been worked for years by small capital. It was worked by the French in the time of their occupation. A peculiar property of the clay pits here is that they swell up from beneath and suck in by slow degrees man or any object left standing in them. A laborer is reported to have lost one or both his boots in it in this way. The supply of iron ore is great. Catalone is rich in asbestos, a rather rare article in the world, and all the uses of which mineral are not yet known, nor is its own formation thoroughly understood. I had hoped to get Dr. Honeyman to write on this subject, and had prepared a parcel for him of the mineral, at his own request, when, alas! to the loss of science he was suddenly called hence. The Asbestos find promise to be a good thing for the place. Every inch gone down into the rock shows an improvement in fibre. It is hoped that the article extracted from the rock will spin and weave into the finest cloth, which is a thing almost too wonderful to think or believe, that a rock would produce silk or wool or flax for the manufacture of garments, and such garments are proof against fire and other elements. Firemen in many cities use asbestos for dress. And if it gets soiled the way to clean it is not by washing but by throwing it into the fire, and it comes out without a stain. Catalone is a fire-moulded region of rock.

ROPE DRIVING.

BY LOUIS L. SEYMOUR, PLYMOUTH, MASS.

THE difficulty heretofore experienced in transmitting large powers from a central station to a number of buildings, lies chiefly in the fact, that shafting must be run at various angles with the main shaft of the prime mover, necessitating quarter turns in belting, level gears, or other similar arrangement, usually placed in subways, where the adjustment is not easy, and the attention given is only casual.

Now that the transmission of large amounts of power by manilla rope is carried on successfully in many places, the points which most interest manufacturers are:—

What is the first cost of the transmitting apparatus?

How long do ropes last?

How far will they carry power without serious loss in the transmitting apparatus?

Assuming the Corliss engine at the Nourse mills to be a fair sample of direct belt transmission, we find that a belt fly-wheel, thirty feet in diameter, and 110 inch face, is used to transmit a thousand horse-power at a speed of fifty-seven revolutions per minute. Eighteen $1\frac{3}{4}$ inch ropes would be required to transmit the same power on a fly-wheel, 46 inches wide, while a rope-wheel, 110 inches in width, would carry forty-four ropes, transmitting 24,000 horse-power.

In a rope-drive, recently planned by the author, two hundred horse-power, is conveyed from a ten-foot rope sheave, on a jack shaft running 122 revolutions per minute, to a driven sheave 60 inches diameter, by five wraps of $1\frac{3}{4}$ inch rope, each 178 feet long, requiring in all 930 feet of rope, weighing 815 pounds, and costing $130.40.

To transmit the same power, a twenty-seven-inch double leather belt, would be employed, at a cost of $725, or nearly five-and a-half times as much. Taking Lockwood and Green's estimate of rope sheaves at the Washington mills, their cost was found to be $5,696.10, while for belt-pulleys the cost would have been $6,846 75, leaving a difference of $1,150.65 in favor of rope sheaves.

The most satisfactory rope for driving purposes, is composed of manilla, whose fibers have been treated with an emulsion in the process of manufacture, which effectually prevents the internal wear, and lessens the friction of the fibers upon themselves when passing around a sheave.

The emulsion also acts as a lubricant between the rope and the groove in which it runs. Such a rope needs no after application to make it pliable, and, after a few months' usage, becomes glazed on its bearing surface, when all external wear apparently ceases.

Proper rope-driving is of so recent date in this country, that no reliable data are available regarding its life.

Judging from the appearance of some ropes, which have run over three-and-a-half years, transmitting more than twice their rated capacity, the life of a rope would be not less than seven years. In earlier drives much difficulty was encountered in the selection of the proper splice. Both the ordinary short and long splices caused a jerky motion in the rope, and they were finally discarded for what is now known as the English splice.

The length of span for long drives should not exceed 150 feet, ordinarily, and when this rule is observed, power may be easily transferred two or three thousand feet with but slight loss.

The advantages of manilla rope transmission are:—

Small first cost.

Slight attention required.

Close alignment unnecessary.

Transmission of large amount of power in small space.

Adaptability to transmission at any angle, in any direction, and at any ordinary distance, without serious loss from friction.

ARE COAL, ORE AND PIG IRON "RAW MATERIALS."

In the discussions that have grown out of the attempt of some Massachusetts manufacturers who consume coal, ore and pig iron, to have these articles put on the free list because they are raw materials, the question arises, are these articles raw materials, even in the sense in which a free trader would define raw materials? That coal, ore and pig iron are cruder forms than bar iron, as bar iron is a cruder form of—in some cases—crucible steel, and in others screws, goes without saying, but the fact that one article is a cruder form than another article into which it may enter, would not be, *per se*, we imagine, any argument why it should be admitted free of duty. The reason why free traders or revenue reformers argue that coal, iron ore and pig iron should be put on the free list because they are raw materials is, because it is asserted that the labor expended in their production does not bear so great a proportion to the total cost as the labor expended on the higher forms into which these materials are wrought. Of course, if any one attacks the whole system of protection, then their claim that these so-called raw materials should be admitted free is only a subterfuge. It is not because they are raw materials that he would have them admitted free, but he would have the duty taken off because it is a duty, and his argument that it should be taken off, because they are raw materials is, as we say, simply a subterfuge. Any one who supports a protective duty on any article can only argue that these so-called raw materials should be admitted free because the proportion of labor expended in their production is small, as compared with the higher forms of iron.

Now, what are the facts? Those two eminent apostles of tariff reform, if not of free trade, Edward Atkinson and the Honorable Abram S. Hewitt, have both demonstrated that at least ninety per cent. of the cost of these articles is labor. When Mr. Hewitt was a member of the House of Representatives, in the course of a discussion concerning the percentage of labor cost, he said as follows:

"The percentage of labor involved in the production of any given article depends upon where you begin to estimate the percentage. If you begin with a steel rail mill, which uses pig iron, the labor will be from twenty-five to thirty per cent. The actual wages paid by a wire mill will amount to about twenty-nine per cent. of the cost. If you include labor in the blast furnace, that would make it sixty per cent But if you go on back to the ore bed, and put in everything which was paid out from the ore bed, the percentage of labor would have been about ninety per cent. I say this because the gentleman (Mr. Thomas G. Shearman, of Brooklyn) proposes to overthrow facts within my knowledge, and for which I pay. I say the amount which I pay out for labor, when I include every particle of raw material, beginning at the ground—and I am a miner of both ore and coal—I have never, with all my anxiety to get it down, got it below ninety per cent. on the value of the finished product"

MR. MILLS—"What is the finished product?"

MR. HEWITT—"Any finished product. I make bar iron."

MR. MILLS—"Is pig iron a finished product?"

MR. HEWITT—"The labor in pig iron will be ninety per cent. of the cost. It actually takes ninety per cent. of the cost of the article for labor when you include everything, from the beginning to the end."

Mr. Hewitt, it will be noticed, claims that the labor cost of coal, iron ore and pig iron is ninety per cent, and it will also be noticed that he said this in answer to a statement of that eminent free trader, Mr. Thos. G. Shearman, who, as Mr. Hewitt says, "proposes to overthrow facts within my knowledge, and for which I pay." It seems to us, after this evidence, no one is justified in claiming that coal, iron ore and pig iron are raw materials.—*American Manufacturer.*

THE ST. CLAIR RIVER TUNNEL.

Six hundred men are now digging the railroad tunnel under the St. Clair River at Port Huron at the rate of fifteen feet each day. This means that before the year is out one of the most important pieces of civil engineering in the country will be completed. More than 1,290 feet of the tunnel proper are now ready for trains on the Michigan side and 900 on the Canadian. The remaining 4,000 feet will be finished at a wonderfully rapid rate, considering the nature of the work, if no accident intervenes. It has raken six months to do the work thus far, but workmen are now more accustomed to the task and can work with greater facility in the use of the machinery, so that the engineers in charge place the completion of the work not later than the end of the year.

The tunnel itself is over 6,000 feet long. The approaches are equally long, so that the entire length will be over two miles. Of this distance 2,310 feet are under the river, 2,390 feet on the Michigan land side, and 2 100 feet on the Canadian. The grading is one foot to every fifty except under the river bottom where it is substantially level. It is an iron cylinder tunnel—the only one of the kind in the country. There is neither brick nor stone used in its construction. Neither are there any stays or supports, simply a mammoth iron tube built in sections underground. It is designed for a single track.

Electric lights make it as light as day, air engines keep the atmosphere as healthy inside as above, and steam pipes hold the temperature at the proper point. It is as dry as a street in summer, and the disagreeable features common to subaqueous works are entirely absent. Work is pushed from both ends.

The method of construction is simple. A great cylinder, weighing more than sixty tons, twenty feet in diameter and sixteen feet long, is driven into the blue clay, which constitutes the entire bottom of the river, by the use of hydraulic power with as much ease as cakes of soap carved out of a general mass. Inside this cylinder, which is called a shield, twenty-two men are at work removing the dirt. As fast as the shield is pushed forward, which is about two feet at a time, the clay thus brought inside the shield is dug out to the edge of the great cylinder. Then the hydraulic jacks are again started, and slowly but irresistibly the immense iron tube moves another two feet into the solid earth ahead of it. Each jack has a power of 3,000 tons, and the combined power behind the shield is more than 40,000 tons.

Another ring of iron lining is put into place and each foot of tunnel is ready for track-laying as fast as the work progresses. There is no mason work, as already stated, and when done the tunnel will practically be a continuous iron tube twenty feet in diameter and nearly 7,000 feet long.

The iron plates that form the lining are of such curvature and length that any thirteen of them with a small key piece will make a circle of twenty feet in diameter. The edges and ends are turned up, each piece being bolted by a dozen large bolts to its neighbor. Each one is eighteen inches wide and weighs as near 1,000 pounds as the foundries can make them. Those for the Michigan side are made in Detroit, and those for the Canadian side in Hamilton, and thus the payment of duty is avoided. These great sheets are handled with cranes and so readily that a complete circle is put up in about half-an-hour. The lining is about six inches thick, so that there is no danger of collapse from pressure.

The ground through which the mineral has passed thus far has been uniformly stiff blue clay. No water has yet been struck, and an occasional pocket of surface gas has been quickly disposed of by turning on a powerful air current. The precaution has been taken, however, to provide for the contingency of striking a stratum of sand which might lead up to the river and let its waters down upon the subterranean workers. A compressed air arrangement is provided for use at once by which a pressure greater than that of the water above would keep the sand in place until the lining could be shoved under it and the danger be passed.

Mr. T. H. Murphy, who has charge of a portion of the work here, says the tunnel will be the most economical one ever built, if no unforseen accidents happen. While employed on the Hudson River tunnel he was satisfied if his men made progress at the rate of thirty feet a day, but here they have averaged over sixty feet daily. The diggers are paid seventeen and a-half cents per hour, the iron men receive fifteen cents, and the remainder of the workmen twelve and a-half cents. Aside from the engineering there is no skilled labor.—*Montreal Herald.*

Industrial and Trade DIRECTORY.

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THEO. H. EATON & SON, Windsor, Ont.; Detroit, U.S.A.—Importers of every Description **Pure Aniline Dyes** for Cotton and Woolen Manufacturers. **Dyed Samples** furnished on application. Address all correspondence to Head Office, Detroit, Mich

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.

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THE OSHAWA MALLEABLE IRON CO. Oshawa, Ont.—Manufacturers of malleable iron castings, to order, for all kinds of Agricultural Implements and miscellaneous purposes.

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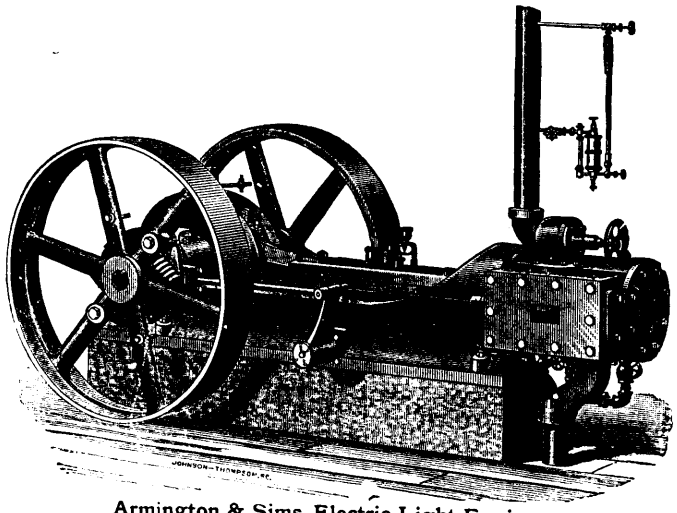
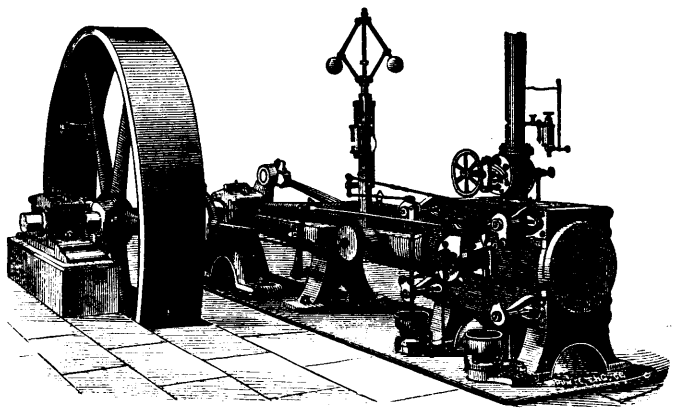
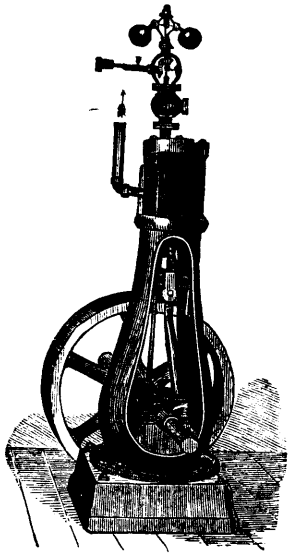


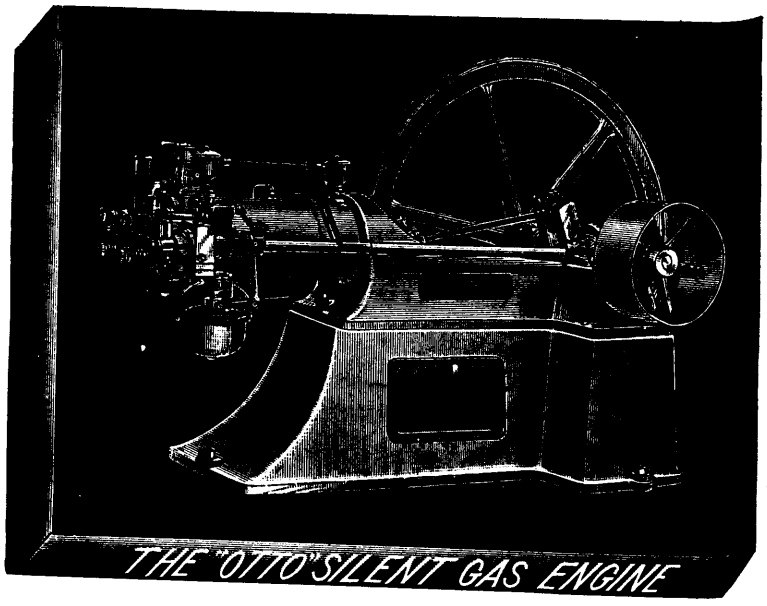
Armington & Sims Electric Light Engines.

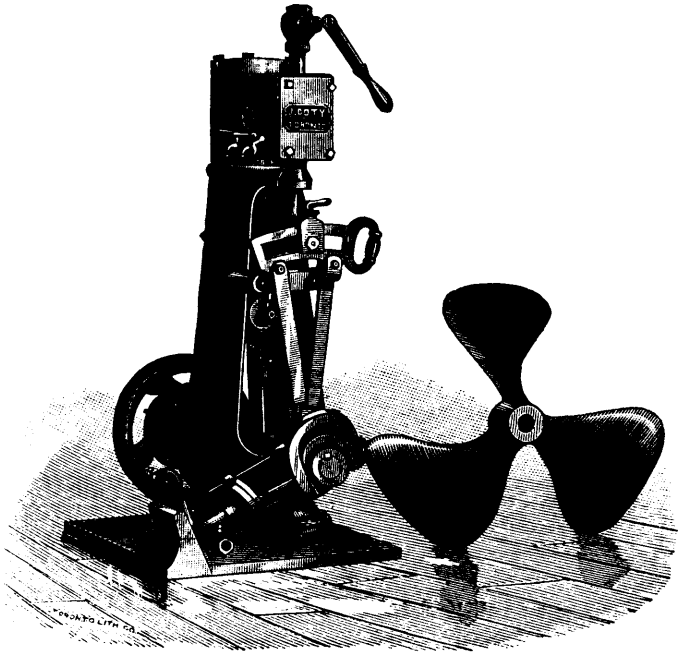


Reynolds-Corliss Engine.



Vertical Engines.





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TRANSMISSION OF POWER

Translated from "The Ingenieur-Conseil," of July 15, 1889.

Transmission by belts is a relic of routine which should be rooted out, as has been already done with the ancient gear-wheel transmission. I venture to predict that by the time another exposition is opened belts will have entirely given way to ropes. I make this prophecy with all the more boldness since belts have not the theoretical superiority over ropes which gearing had over belts. It can already be said that in theory and in practice belts are inferior to ropes, since they can only be made to adhere by a tension of both parts—that is, the part which does no work must have at least half the tension of the part which bears the working strain. Without this tension the belt would slip on the pulleys. No change of material or of make-up can correct this essential fanlt—the necessity of stretching to accomplish adherence.

With ropes, however, the adherence of the rope to the pulley is effected by the pressure against the sides of the wedge-shaped groove, and the useful tension, that of the working part of the rope, is sufficient to produce this pressure. The lower part of the rope has no need of tension. Thus, in theory, the rope is better than the belt, and in practice no drawback arises to offset this advantage. On the contrary, rope cannot slip—like belts—from pulleys The breaking of a rope occasions no stoppage, no accident. The rope falls harmless to the ground and can be replaced after working hours. It even announces when it intends to break by visibly unwinding.

For thirty years we have sustained the rope idea, and made the foregoing argument prevail. We understand the opposition of the routinists at the present time. Very few makers knew how to turn out good grooved pulleys, or could supply good ropes. This was a serious difficulty. The slightest inequality in the diameter of ropes, or in size of grooves, or even in the compressibility of the ropes causes them to bury themselves in grooves more or less so sensibly altering the circumferences run over by the different ropes on a single pulley, and consequently gave rise to considerable resistance; certain ropes acting as brakes towards the others, instead of assisting them.

At the Exposition transmission by ropes is practiced by three Belgian firms, two Swiss firms and two French, all other employ belts.

Why? We cannot explain, but when the next Exposition opens, we will see if they continue to inflict upon their patrons a mode of transmission which, whatever be the ingenuity of the makers of belts, leather, cotton or steel will always cost more, absorb more power and cause more stoppages than transmission by ropes. Until that time the Belgian firms have found themselves in excellent company among the constructors of machinery who have adopted this method of transmitting power.—*From the Ingenieur-Conseil of July 15.*

The above extract is confirmatory of what has been advocated by THE DODGE WOOD SPLIT PULLEY CO. from the commencement, *i.e.*, that power transmission by ropes is far superior to belts for general purposes and applicable for distances and in places where neither belts or gearing can be used at all.

The French writer intimates clearly that for thirty years he has recognized this superiority of ropes and yet the people have refused to be convinced. This argues a fault in the system which he advocates, and that fault is not far to seek. The system which he advocates is known as the "English" system. It consists of a multiplicity of separate ropes, and the "fault" resides in the impossibility of attaining an equal tension of the several ropes. That this lack of uniform tension is the condition of every "English" rope transmission is evident to the eye. No two ropes of the system hang with the same slack, and it needs no argument to show that for that reason no two are doing the same duty. The rope having the strongest tension is, therefore, overloaded and will be first to give out; and it is small consolation that its giving out does not stop the works, since the fact that a part of the system is doing no work shows that the whole thing is an overload and that a much smaller outfit would do the work with equal satisfaction if properly constructed.

That is precisely what has been accomplished by the American System, as brought forward and perfected by the Dodge Manufacturing Company, wherein a single endless rope, having any required number of passes, and under uniform tension throughout, transmits power uniformly, each strand doing its full share of the whole duty.

While thirty years have so far failed so show the practical advantages of the English multiple system, that in the year 1889 only seven users of it appear in the great Exposition at Paris, and American engineers have almost to a man, repudiated it, the American single rope system has in three years attained a popularity almost unprecedented, and bids fair, in the near future to supplant belts for all purposes except the smallest.

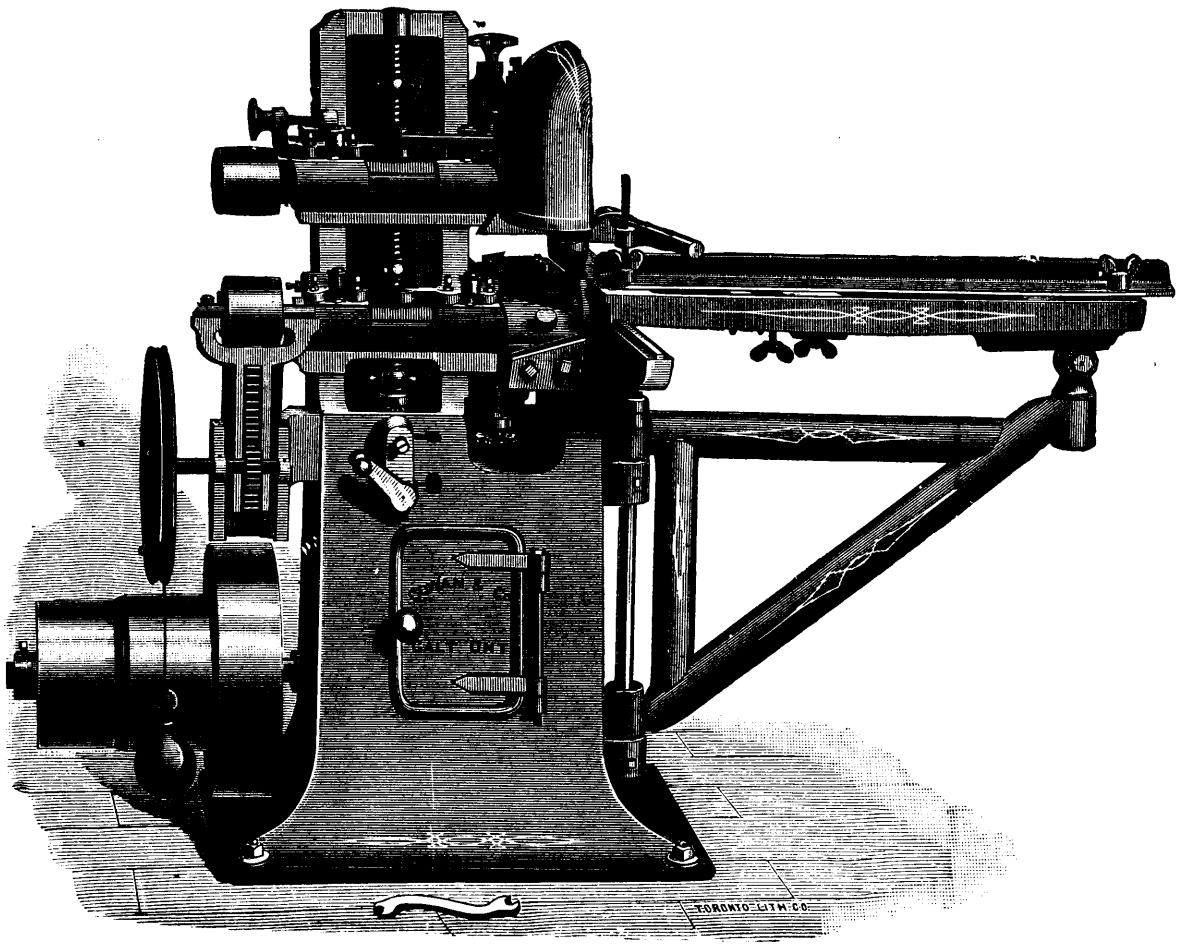
For estimates and full particulars regarding this modern system of transmitting power, apply to

The Dodge Wood Split Pulley Co.,

BOX 333, TORONTO.

NEW AND IMPROVED

Pedestal Tenon Machine.



This is an entirely new style of Tenon Machine. The frame is cast in one piece, and the working parts stand solidly on a pedestal, avoiding all vibration.

The Cutter and Cope Heads are connected and are moved all together, or separately, as required. The Upper Head and Boxes also adjust horizontally to suit shoulder of tenon, the Cope Knives moving with the Heads to prevent re-adjustment.

A special feature in this machine is the Bed, or Carriage, which is at once light and strong. The outer end works on rollers and is moved very easily.

In cutting the tenon the Bed and Carriage move entirely past the Heads and Cutters, the operator having full control of the work. It has also the advantage of leaving the Heads and Cope Knives clear, and of ready access by the operator.

The Carriage is so arranged that it cannot tip over the Slides nor be thrown into the Cutters, and is also supplied with extension bar for long stuff, as in all Tenoning Machines.

This Machine is supplied with single or double Copes, as ordered, and for furniture work it is without Copes, and with an adjustable cut-off Saw.

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"Galt Foundry" Engine and Machine Works, GALT, ONTARIO, CANADA.

Corliss and Slide Valve Engines, Boilers, and Wood-Working Machinery, all kinds New Patterns, Highly Finished.

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