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CANADIAN MANUFACTURER AND INDUSTRIAL WORLD

DEVOTED TO THE MANUFACTURING INTEREST OF THE DOMINION.

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WHAT PROTECTION IS FOR.

THE Toronto *Mail*, in arguing against tariff protection, calls attention to the fact that the proprietors of certain iron-working establishments in New England have prepared a petition to Congress praying that iron ore, coal and coke be put on the free list, and that the anti-bellum ad valorem duty of twenty-four per cent. be restored on pig iron, scrap iron and scrap steel. The contention is maintained by citing the fact that whereas in 1872, with a specific duty of $6.30 a ton on pig iron, the equivalent ad-valorem duty was 14.4 per cent., while the present duty of $6.72 a ton has its equivalent in 37.5 per cent. ad-valorem, and this because of the decrease in the price of pig iron. It says that the duty last year amounted to a little over 67 per cent of the price of Scotch iron, and at present it is over 80 per cent., which is practically prohibitory.

The production of pig iron in New England is not decreasing, although it is not advancing as rapidly as in some other sections of the United States. Pig iron is made in only three of the New England States—Maine, Massachusetts and Connecticut, and in these the product was as follows :—

1886	32,574 net tons.
1888	40,466 "

In 1886 the production of pig iron in the United States aggregated 6,365,328 net tons, and in 1888 the production was 7,268,507 tons. In this latter year, Pennsylvania produced 49·3 per cent. of the total; Ohio, 15·2 per cent.; Illinois, 8 per cent., and Alabama 6·2 per cent., all other States falling below 4 per cent. In 1888 the production of the Southern States was 203,422 net tons larger than in the preceding year, the production by that section being as follows :—

1882	577,275 net tons.
1884	657,599 "
1886	875,179 "
1888	1,132,858 "

The average prices per gross ton of 2,240 pounds of No. 1 foundry pig iron at Philadelphia were as follows :—

1872	$48.87
1874	30.25
1876	22.25
1886	18.75

These figures show that while New England is not standing still in the production of pig iron, other sections of the country are making longer strides in that industry; and that since the date first mentioned by the *Mail*—1872—the average price of pig iron has decreased from $48.87 to $18.75 in 1886, and this in the face of a slight increase of duty. They also show that even according to the specious argument of the *Mail*, pig iron was cheaper in 1888 when paying an ad valorum duty of 80 per cent., than in 1872 when paying an ad valorum duty of only 14·4 per cent.

The *Mail* quotes the New England grumblers as saying :—

"The heavy mill-wrighting business hardly exists in New England; the old millwrights are dying off and few are being educated to take their places. Their vocation is gone. Our iron and steel architectural beams, columns, roofing, gas pipes, water pipes, and sewer pipes, are made in Pennsylvania. The iron stores and workshops in which New England men transact their business and do their work are built with Pennsylvania iron, machined by Pennsylvania mechanics, and are erected by Pennsylvania superintendents, in accordance with plans made by Pennsylvania engineers Our heavy machinery is also made in gigantic Pennsylvania foundries and fitted up in spacious Pennsylvania workshops."

All of which may be the fact, but it does not tell against Protection, but rather in favor of it. There is no more reason for charging American Protection with the failure in New England of these iron industries, seeing they have only been transferred from one part of the country to another, than our own N. P. would be chargeable for the failure of the *Mail* as an industrial enterprise if it had been established on Manitoulin Island or in Labrador, instead of in Toronto.

Queerly enough the deadly parallel column business in the *Mail* confutes the *Mail's* own argument, for adjoining its editorial from which we quote is an editorial note calling attention to the extraordinary rush of English capital to the United States, largely to the South, where many millions are being invested. Why do these Free Trade English capitalists invest their wealth in the iron industries of the South? Protection. They can make cheap iron there, and as there is no inter-State tariff, and as there is a large New England demand for iron, they can lay their Southern iron down there cheaper than the New England furnaces can make it; and although the New England furnace men may not be pleased with the situation, the consumers of iron in New England are reaping the benefits which were promised from Protection. These English capitalists, who include many of the leading iron and steel makers of Great Britain, are building extensive steel and iron works in the South, over $4,000,000 in cash having already been paid out by one concern for mineral lands alone, while over $7,000,000 more are pledged for the erection of forges, foundries, steel plants, etc. This is what Protection is for.

OVER-SEA *VS.* INTERNAL MARINE.

THE United States has a merchant marine tonnage of 3,248,132, for its internal trade, but only 943,784 tons "registered for over-sea." The tendency is steadily downwards. The United States had more than two and a half millions of tons of

vessels for foreign trade in 1860, when the tonnage of the United Kingdom was only four millions and a half. In short, the United States merchant navy in 1860 was much more than half as large as that of the United Kingdom: in 1888 it was little more than one-eighth. Yet there are people who grumble at Free Trade.—*London Daily News.*

This "internal trade" of the United States is that wherein only American built vessels are employed, including all trade between different ports in that country—coastwise and river—and from which all foreign vessels are excluded. Although not as large as the trans-Atlantic steamers, those engaged in the coastwise trade are as staunch, strong, seaworthy, fast, comfortable, safe and as elegantly furnished and equipped; and they reflect most creditably upon American enterprise. According to the *Daily News*, in 1888 the total tonnage of the British Empire was 9,209,883, of which 7,427 753 belonged to Great Britain, the balance, 1,782,130 tons, being distributed among the different dependencies. While the *Daily News* may be correct in its general statement, it is evidently badly astray when it says that the merchant navy of the United States in 1888 was little more than one-eighth that of the United Kingdom. It evidently had reference to the 943,784 tons 'registered for over-sea."

The sentence, "Yet there are people who grumble at Free Trade," involves an inquiry. By it is sought to be conveyed the impression that Free Trade is conducive to the building up of vast commercial navies by all those countries which practise it; and that Protection works contrariwise. The *Daily News* displays the fact that in 1887 only two European countries had over a million tons of merchant shipping: Norway, with 1,503,572, and the German Empire with 1,240,182 tons; France coming next with 972,526 tons, and then Italy with 895,625 tons. The inquiry is concerning the benefit Free Trade is to the British Empire outside of Great Britain. Why is it that all the balance of the Empire possess but 1,782,130 tons of shipping, as against 7,427,753 tons for Great Britain? If the fact is of any value it proves that the policy of Great Britain is to suppress ship-building everywhere else than in Great Britain, and that British Colonies and dependencies stand in no more favorable position in this respect than foreign countries.

To Americans it is a lamentable fact that their shipping "registered for over-sea" does not maintain the prestige it did thirty years ago; and it is evident that the most salient cause is that this part of their mercantile navy does not receive the protection and encouragement accorded to what is known as their coastwise and river shipping. In this latter business it is unlawful for any foreign vessel to engage; for no foreign vessel is permitted to convey either freight or passengers between ports in the United States.

The transition from sailing vessels to steamers in the carrying trade of the world occurred when the United States was engaged in suppressing a most formidable rebellion; and when that country recovered from that struggle it was to find that Great Britain held almost entire control of ocean transportation. The United States had previously abandoned a feature of its tariff laws by which discrimination was made in favor of American vessels; and ever since the war political influences there have prevented the re-establishment of such discrimination. In 1850 from eighty to ninety per cent. of the foreign commerce of the United States was carried in American ships—now they carry not exceeding ten per cent. In 1850 the value of that foreign trade amounted to about $300,000,000, while in 1887 it was $1,500,000,000; and for years that country has paid the shipping of other countries about $100,000,000 annually for freights on American exports and imports, while American vessels have been paid not exceeding one-tenth of that amount. For many years Great Britain has been paying large subsidies to her steamship lines, aggregating from $3,000,000 to $5,000,000 a year; in one instance at least guaranteeing to one line a net annual dividend of eight per cent. This may be a species of Free Trade, but it is strongly flavored with Protection.

On the other hand the pay accorded by the United States to its own ships for carrying its mails to foreign countries in the face of foreign competition is ridiculously small as compared with what other nations pay for similar service, and more than mean and parsimonious as compared with what it pays American vessels engaged in its coastwise and river trade, where there can be no foreign competition. During the last year for which the facts are attainable, the United States paid $44,500 for the transportation of mails on steamers plying on Arkansas rivers, and only $13,715 for carrying the mails across the Pacific Ocean to Japan. It paid $54,700 for river mail service in Washington Territory, and only $42,593 to all Asiatic and Australian ports. It paid $79,637 for carrying the mails on the rivers of Florida, but only $47,997 for sending them to all Central and South American countries and the entire West Indies, except to Havana. It paid $20,879 for steamboat mail service on the Ohio River between Paducah and Louisville; $101,566 to subsidize stage coaches in Nevada; $239,568 in Washington Territory; $163,893 in Idaho, and $417,000 in Colorado, and but $86,890 to all American steamers carrying the American mails to all foreign countries

It is one of the strangest phases of American politics and statesmanship that this anomalous condition should exist.

FLAX AND ITS PRODUCTS.

DURING the first three months of the year 1889 the importations into the United States of manufactures of flax aggregated $7,445,199, and the importations of flax and substitutes thereof, unmanufactured, aggregated $6,086,957, a grand total of $13,532,156. This is at the rate of over a million dollars a week.

The soil and climate of both the United States and Canada are quite as well adapted to the successful cultivation of flax as is that of Ireland, Russia and Germany, and yet the industry on this side the ocean is almost entirely neglected, or carried on in such a desultory manner that it can scarcely be taken into account when considering the extent of it in the two countries. It indicates an astonishing short-sightedness on the part of Canadian and American farmers and manufacturers that flax is not more extensively grown, for it could be always counted on as a sure crop that would produce an average of abont fifteen bushels of seed per acre, worth a dollar a bushel: two and a half tons of flax straw worth $20 per ton, from which could be produced a thousand pounds of flax fibre, worth $200 a ton. It would seem to any thoughtful person that this is a matter worthy of consideration.

The flax industry in Ireland is an old one; for the Milesians, who conquered Erin thirteen hundred years before Christ, introduced there a knowledge of the cultivation of flax, and also the art of spinning and the manufacture of linen fabrics. In the Irish Book of Rights it is recorded that among the tributes paid by the provincial kings were garments of linen, embroidered in colors and with threads of silver and gold. In the days of Saint Patrick the art of weaving and embroidery had attained what was then considered a high state of perfection, and history tells us that that good man himself gave constant employment to three noble ladies, one of whom was his sister, another the daughter of a noble of high rank, and the third a daughter of the King of Ulster. Eochaidh, one of the ancient Irish kings, was himself a cloth designer who introduced the weaving of various colored cloths, by which the social rank of all wearers might be known. Five hundred years before the Cromwellian Commonwealth hand linen spinning and weaving had reached a perfection in Ireland not surpassed in any other country, but the wars which devastated that unfortunate island for nearly a hundred years almost wholly destroyed the industry; and it was not revived until the revocation of the edict of Nantes drove large numbers of skilled artisans and their families from France to Ireland. Many of these settled in the counties of Antrim, Armagh, Down and Tyrone, where they found employment in the towns of Belfast, Lisburn and Lurgan.

Wet spinning of linen yarns was begun at Belfast in 1830. Previous to that time three-fourths of all the yarn used in weaving linen was made on the ancient spinning-wheel, in the homes of the cotters and farmers among the peasantry. A woman servant was not only expected to accomplish her every day household duties, but in addition she must spin a certain amount of yarn weekly. Mothers, daughters, and even the old grandmothers had their allotted hours at the wheel, and its buzz and hum were seldom missing from the cabin save during hours of sleep. The women of Tyrone were most famous in all Ireland as spinners; and their "kemps," or spinning-matches, often plunged a whole townland into excitement. So late as 1850 only fifty-eight power-looms for linen weaving were in use in Ireland. In the intervening years the increase in importance in every branch of linen manufacture has been marvellous. The amount of capital invested in this industry alone in and about Belfast, exceeds $110,000,000. Thirty-five spinning-mills, with over 850,000 spindles, and about the same number of weaving-mills, driving 25,000 looms, are in operation. These employ in all capacities more than a hundred thousand persons; and more than four thousand male and female operatives may be seen at work in one establishment in the city of Belfast every day in the year.

In all the world there is no agricultural product so rich in labor, from seeding to the ultimate of preparation for use, as flax. To begin with, the preparation of soil requires more labor than for any other sown crop. Before flax-fibre is marketable by the farmer several distinct labor processes are necessary. Weeding, a slow and laborious process, is the first one. Then comes the pulling and sheafing, or gathering the flax into "beats" in the field. After this it is carted to the "steep-pond" and "rotted" or "steeped" from eight to ten days. Then the wet and sticky stuff is again carted to the field or "spread-ground" and carefully dried. "Lifting" and "stooking" follows this, so that the flax may be again got into sheaves and "capped," as with the "grain-shocks" of America, for additional drying and curing. It stands in these for some time, and is then taken to the "scutch-mill," where the roots branches, withered bolls, woody heart and flinty outer sheath are removed. The fibre comes from the "scutch-mill" in wisps, or "strikes," containing about one and one half pounds each. These are tied with a twist of the fibre into stone or fourteen-pound bundles, and are ready for the little Irish market towns, where the flax factors, or buyers, pay the farmer about six shillings per stone for it.

The conversion of this flax fibre into thread for the weavers' use involves an interesting series of processes, and in these great spinning mills of Belfast they are all carried on under one roof. The first process is termed "roughing." The fibre is still filled with flinty slivers of the flax-sheath. These are removed by drawing the flax through coarse steel combs, wholly a manual operation; and lads of from fourteen to eighteen years of age, called "roughers," are employed. It is stifling, dreadful work, the air being filled with myriads of almost impalpable particles pointed like steel. The constant inhalation of these soon produce consumption and other fatal lung diseases. For the privilege of existing a while under these circumstances "roughers" are paid about nine shillings per week. The next operation is one of a similar nature, called "hackling" Straightened in steel clamps, the fibre is further cleaned and combed by concentric steel teeth revolving towards each other. Machine tenders, called "screwers," lads from eight to twelve years old, are paid from five to seven shillings per week for this work. The bunches of flax taken from the machines by other lads are laid crosswise in wooden frames. When one of these is filled it is called a "tipple of flax," and the "tipplers" are paid eight shillings per week.

The next process is effected in the sorting room. This is filled with benches, each provided with a stationary double steel hackle or comb. A very coarse one "opens up" the bunches of flax without breaking the fibre, and a much finer one is used in finishing the combing and dressing. Flax "sorters" are undoubtedly the most skilful men connected with any branch of linen manufacture. Their deftness in dressing and sorting is truly marvellous. Half-a dozen different grades of weight and color are often found in one bunch of flax, but when the silken stuff leaves their hands there is not a particle of variation in weight or shade in the shining, hair-like piles before them.

The utmost these sorters are permitted to make is twenty-five shillings per week. All the subsequent processes are in the hands of girls and women. The sorted flax is carried to the "spreading-machines." These are provided with boards over which straps, moving at the speed of eighteen inches per minute, run between cylinders to "spread" and "blend" different desired grades of dressed flax. A girl standing at the right of each machine supplies or "spreads" these never-halting straps with little wisps of differently-graded fibre, so laying each wisp on each strap that an even quantity is constantly being received by the cylinders. This work is done with incredible rapidity. Proficiency requires years of practice, but the wages are but eight shillings per week. The flax

is delivered from the "spreaders" into cylindrical cans in continuous shining "slivers," looking for all the world like a thin ribbon of confectioner's taffy. Automatic indicators ring bells when a certain desired quantity has been wound into the cans. These are removed for the fifth process to the "drawing" rooms, where machines, attended by women, double and "draw out" the "slivers" of fibre, until when it leaves this process, in round numbers, fully 20,000 "doublings" of the fibre have taken place; all for the purpose of "levelling," or evening, the "sliver" before spinning. The next operation is that of "roving," where from sixty to eighty "slivers" are run through each frame, and wound by machinery upon spools into "roves" ready for the spinning-machines. The women thus engaged are known as "rovers," and earn from seven to eight shillings per week, set wages. The seventh and last process in the manufacture of linen yarns is spinning. This is so well known that extended description is unnecessary. The great machines are fed from the "roves" just mentioned, the flax "slivers" passing through boiling water over brass rollers to the spindles, which make from 4,000 to 6,000 revolutions per minute; the spun thread passing from spindle to spool with such vibration and speed that it is scarcely visible to the eye. All spinners are women.

The struggle for life of these operators is pitiable. They are taken on as "helpers" at ten years of age, and are allowed to work every other day for two shillings ninepence per week. From three to five years of such labor are required to make them "full spinners," when they receive only from eight to nine shillings per week. For reasons which are claimed as necessary, they are compelled to labor in rooms at a temperature of ninety degrees, and manufacturers themselves say that the escaping steam, the dreadful odor of hot oils, the foul air and the intense heat, kill fully thirty per cent. of all spinners before they reach twenty-five years of age. Th se poor beings live and die in ignorance of any personal comforts—shelter, food or raiment—yet it is upon them that those who indulge in the luxury of fine linen must largely depend for what they use.

THE MILLERS AND THE TARIFF.

Discussing the recent meeting of Ontario millers in this city, the *Monetary Times*, after saying that the Dominion Government, in answer to a deputation of millers who had asked for relief from the unfair discrimination of the tariff, challenged production of the evidence on which their complaint rested, and that this evidence had never been presented asks: "Under these circumstances what do the millers do?" It answers its question by stating that "They meet in convention only to talk of their grievance, in a general way, and do not produce a particle of evidence on which the most insignificant case in a division court could be decided. They ask the Toronto Board of Trade to interest itself in their behalf, and they resolve to issue an appeal to the farmers of Ontario and Manitoba showing the effect of the tariff on the miller and the farmer, and other matters, the relevancy of which is not readily apparent. * * * The neglect or refusal to produce independent evidence of the truth of the alleged grievance is not the way to succeed or to deserve success."

No doubt the *Monetary Times* imagines that the millers made a fatal mistake in not inviting it to their meeting and acting on the advice it was evidently aching to give. Perhaps it thinks that the meeting itself was a superfluous affair and might have been dispensed with by having it appointed curator for all the millers in the Province, with unlimited power to act. The general impression abroad is that the Ontario millers are sensible men of great conservatism, and that while they have not been very demonstrative regarding the political difficulties that environ them, they are now very much in earnest in discovering some remedy by which their business may be placed on a better and more satisfactory footing than it now holds. It may be true that the millers at their meeting "talked of their grievance in a general way;" but it is not true that they "did not produce a particle of evidence" to show that the Dominion Government had it in their power to relieve them of a burden that they say is rapidly crushing them into insolvency and ruin. It may be, as the *Monetary Times* states, that the milling business is overdone; that the big mills try to crush the small ones; that their system of buying wheat is wrong, and that they pay too much for wheat; but the milling business is not very different from other sorts of business, and these incidents may exist in some form or other in any business; and if these constituted the only grievances which the millers suffer under, it is not probable that their convention would have been held. The real grievance has reference to the tariff, which imposes a duty of 50 cents a barrel on imported flour, and 71¼ cents on the imported wheat necessary to make a barrel of flour. This was the main subject for discussion, and the other matters were but side shows to the great problem. That this is so is evident from the fact that in the Chairman's opening address this was the first and only point he touched upon; and this theme constituted the warp and woof of the whole proceedings. Perhaps the *Monetary Times* may fail in seeing in the facts presented any "particle of evidence" that the millers have a grievance in this tariff discrimination, but then the millers are not to blame if that journal has not sufficient intelligence to comprehend that two and two make four.

Mr. David Plewes, the Secretary of the Millers' Association, states that for eight years past the millers have represented to the Government that they were discriminated against in this matter; that the fifteen cents per bushel duty on four and three quarter bushels of imported wheat—the Government standard for the equivalent of one barrel of flour—is twenty-one and a quarter cents more than the fifty cents a barrel duty on imported flour; and this fact can be verified by the Government, the *Monetary Times*, or by any one who can do a simple sum in arithmetic. It should also be remembered that when flour is imported into Canada, freight is paid on only 196 pounds, while on the imported wheat freight is paid on 285 pounds; and another point is that if Canadian millers desire to sell their bran and shorts in the United States, obtained from grinding this imported wheat, it is liable to an import duty there.

There is no use in muddying the water in discussing this matter, either for financial, mercantile or political reasons. The crisis exists, and it should be faced.

PROTECTION IN RUSSIA.

MR. HUNT, British Vice-Consul at Kertch, Odessa, Russia, in a communication to his Government, says:

"As for imports of English goods, if the small amount of agricultural machinery, which arrives here through Odessa agencies is excepted, the rest may be put down as *nil;* the enormous protective duties, which are still increased by at least forty-five per cent. on account of its being collected in gold currency at standard value, bring the system from protective to absolutely prohibitive. This policy, no doubt patriotic and sensible for the northern parts of Russia, where Moscow, Warsaw, Tula, and other great manufacturing towns are situated, is unquestionably a ruinous policy for the southern or agricultural half of this enormous empire. The Russian manufacturers and artisans cannot compete in cheapness of production with the English, and the article is dearer at first cost. Besides, the Russian railway tariff being very high, and the distances enormous, the transport of the article, say from Moscow down here, compared with carriage by sea from England, is about sixty per cent., and in some instances 100 per cent. higher. These protective duties cause much dissatisfaction in the south, and if the Moscow manufacturers are influential enough to bring pressure to bear on the financial authorities to keep up the present system, the latter should compel the manufacturers to establish agencies nearer to their customers in the south, who could then supply their wants without paying such enormous transit charges."

Alluding to the importations of goods from England, chiefly agricultural machinery—portable engines, steam threshing-machines, belting, etc.—Mr. Hunt says:

"Were it not for the excessively heavy duties which the Russian Government impose upon almost every class of goods, English manufacturers would be able to hold their own against all comers, as their goods are preferred to those produced by the home makers. In spite of the prohibitory course of exchange, and hostile duties, there was a great increase in the imports into Kieff for 1888, when compared with the preceding five years. This result was due to a very abundant harvest, which, following on the exceptionally good one of 1887, gave trade the desired impetus. In fact, such was the demand for portable engines, steam threshing machines, and other agricultural implements, that the supply fell miserably short of the demand, notwithstanding the fact that at the time these goods were imported there was a difference in price of from twenty to thirty per cent., owing to the low value of Russian money."

The Vice-Consul, speaking of the outlook for trade in the vicinity of Berdiansk, says:

"A most profitable year can be reported, as, owing to the enormous harvest and scarcity of laborers, the agricultural machinery manufacturers had more work than they could get through; every machine, good or bad, was sold throughout the entire district, the prices at the latter part of the season increasing fifty to seventy five per cent., and the demand could not be satisfied even at these rates. Upwards of 1,000 cheap reaping machines were made and sold in this town, and about 15,000 more in various parts of this district, prices ranging from £12 to £21."

From which it will be seen that Protection is doing its good work in Russia. Consul Hunt shows that that part of Russia in which the great manufacturing towns are situated is in a highly prosperous condition, and that, in his opinion, the policy of Protection is both "patriotic and sensible." Perhaps at this time it is a fact that "the Russian manufacturers cannot compete in cheapness with the English," but this was also the fact as regards the United States in the earlier days of Protection; and even as in nearly all lines of manufactures the latter country can now fully compete with Great Britain, both as to excellence of products and cheapness of price, so, too, it is reasonably to be expected that in the not far distant future the manufacturers of Russia will be equally able to compete with the same country.

Canadian manufacturers would do well to study the Russian situation, particularly as regards the manufacture of agricultural implements. It is indisputable that both Canadian and American agricultural machinery is far superior to similar machinery made anywhere else in the world, Great Britain not excepted; and, as Consul Hunt shows, there is a vast and growing demand there which should induce a large trade in that direction.

EDITORIAL NOTES.

THE total value of the mineral products of Canada for 1888 is given by authority as $16,500,000, as against $14,452,000 in 1887.

A BILL has passed the Illinois Legislature, providing that when employes are compelled to sue for wages, the employer, if judgment be obtained, shall be compelled to pay claimant a reasonable attorney fee.

"THE distribution of bread, after it is baked," says Edward Atkinson, "now costs the average workman in a city as much as it does to grow the wheat, mill it, barrel it, move it 1,500 miles, and convert it into bread, all put together."

PRIZE-FIGHTER Sullivan has not been content with knocking out a rival in the ring; he has successfully "slugged" the rest of the life left in the enforcement of the United States law.—*Toronto Empire.*

The United States has no law to be enforced against prize-fighting in the United States. It is no part of the duty of the United States to make any such law.

"NEWFOUNDLAND would prefer annexation to the United Ssates to a continuance of the present Dominion form of Government."—*New York Australasian and South American.*

Our valued contemporary claims to circulate in all parts of the world; and it frequently pretends to enlighten the nations by publishing its views in several languages; and yet it alludes to Newfoundland as being a part of the Dominion of Canada.

THE amount of water passing over Niagara Falls varies with the height of the river. Prof. W. D. Gunning estimates the average amount at 18,000,000 cubic feet per minute. Allowing 62½ pounds to the cubic foot, this would give a total of 562,500 tons per minute, of which somewhat more than two-thirds passes over the Horseshoe Falls. Other estimates place the total amount passing over both falls as high as 100,000,000 tons per hour

CANADA is represented at the Paris Exhibition by an Indian wigwam. The exhibit appears in a department designed to illustrate the dwellings of mankind from the earliest times to the present. It is to be hoped the Parisians will not misunderstand the wigwam, and attribute to us a simplicity of architectural style to which we really do not aspire.—*Mail.*

The building of Indian wigwams is an "indigenous industry," but Canada encourages and sustains many and more valuable industries that are not indigenous, and which she would never have had if it had not been for the protection afforded them by our glorious N. P.

HERE is the way Bob. Ingersoll puts it: "Here is a shoe-shop. One man in the shop is always busy through the day—always industrious. In the evening he goes courting some nice girl. There are five other men in the shop that don't do any such thing. They spend half of their working evenings in dissipation. The first young man by and by cuts out these others and gets a boot and shoe store of his own. Then he marries the girl. Soon he is able to take his wife out riding of an evening. The five laborers, his former companions, who see him indulging in this luxury, retire to the neighboring saloon and pass resolutions that there is an eternal struggle between labor and capital."

THE City of Saint John, New Brunswick, is making great preparation for the Electric Exhibition which is to begin there on July 22, and continue ten days. It is not enough to say that this will be the most extensive display of electric appliances ever made in the Maritime Provinces—it should be the most extensive ever made in Canada; for there is every indication that the affair will be a unanimous success. Most people now understand that electricity is being put to a multitude of uses, but few people can imagine the extent and variety of those uses; and a visit to this St. John Exhibition will afford the opportunity to just simply "see sights." Go. The railways are offering special inducements in the way of low fares.

MR. DOPPENHEIMER, the Mayor of Vancouver, has issued a valuable pamphlet, in which it is stated that British Columbia will probably one day rank among the richest mineral districts of the world, there being found there gold, silver, copper, iron, coal, lead, cinnabar, platinum, antimony, bismuth, limestone and plumbago. Some of these minerals have been profitably mined for years, while others are waiting for further development. Iron ore exists in large quantities in various parts of British Columbia; but the deposits most favorable for working are situated at Texada Island, in the Gulf of Georgia, about 60 miles by water from Vancouver, where there is a perfect mountain of ore, which assays 68.4 per cent. of iron. Copper is found in a number of places, and coal is widely distributed.

SOME of the iron moulders in Galt, Ont., who are members of the International Moulders' Union, are out on strike because the proprietors of the foundries there decline to allow the Union to manage their business for them. Heretofore the men have been paid *ad valorem*, but the Union desire to have a specific duty for services rendered, regardless of value. The aggregate amount of wages paid would not be materially affected by acceding to the demands of the Union, but manufacturers decline to pay any man more than he is worth, at the expense of his business, or at the expense of the more worthy workmen. It is understood that the Union pay these strikers during their idleness $7 a week to those who have families, and $5 a week to single men. The foundries are well provided with moulders nothwithstanding the strike.

THE British Consul-General at Constantinople, Turkey, reporting to his Government regarding the non-use of agricultural machinery in that country, says that only about six threshing machines, all of which were of English make, were imported to Constantinople during the last three years, and four of these were for farms belonging to the State. An unsuccessful attempt was made to introduce American self binding reapers. Though they worked well enough on clean fields, which are rare in Turkey, they naturally choked when coming in contact with brambles, bushes, and tall, thick weeds, or Indian corn stalks. Those imported were ultimately shipped to Russia, where they gave every satisfaction. Side-delivery reapers are the most suitable implements of this kind for Turkey, but, in the only instance where they were tried and found to work successfully, the laborers threatened to set fire to the farm if they were retained, and they had to be taken back.

A NEED of better facilities for the handling of supplies and products in large manufacturing establishments has led to the adoption of tramway cars propelled by electric motors. A greater part of the large mills being supplied with electric lighting systems renders this an easy matter, and it is safe to predict that before long the electric tramway will come to be considered a necessary feature in mill equipment. One electric company in the United States has already equipped several tramways, and has contracted for others which will soon be put in operation. The tramway car at a company's works, in Lynn, Mass, is used for carrying heavy machinery to different parts of the factory, and its use permits the handling of apparatus with much greater ease, in less time, and with less labor than could possibly be accomplished by any other method. The car is equipped with two 3-horse power motors, and easily carries up a grade of 13 per cent. a load of five tons, while from eight to ten tons can be carried on a level. The motors receive their current through an overhead wire from one of the generators in the factory.

ENGLISH Free Trade forces them into competition with the special advantages of each and every people of the commercial world, in varied lines of production. The labor-saving machinery and inventive genius of the United States; the close economies of France and Belgium; the technical training of Germany; the mechanical facilities of Italy, aided by a mild climate and easy condition of existence; the patient and delicate handiwork of India, backed by English machinery and organization, and climatic conditions that reduce the cost of living to a minimum; are all concentrated upon the English market, and the ragged and hungry workmen of London must fight them, unaided by a government whose policy it is to buy in the cheapest market regardless of home industry. The difference between the poverty of New York, shifting, ever eliminated by departure for new fields of labor, ever renewed by fresh importations from Europe; ever hopeful for new outlets for willing hands; and the sodden, hopeless, helpless, ever-enduring poverty of London marks the difference between the industrial systems of the United States and England.—Victoria, B.C., *Standard*.

THE *Empire* ought not to blow hot and cold with the same mouth at the same time, if it desires to be consistent, but this is just what it does occasionally. In a recent issue, speaking

of something the Boston *Herald* had said about American manufacturers and their desire to utilize Canada as a dumping ground for their surplus products, says that something must be done for the Yankee manufacturer in the way of procuring for him a more extended field than his home market for his manufactures. The fair inference to be drawn from what the *Empire* says is that under existing circumstances manufacturing in the United States is not profitable, and that access to foreign markets must be had. But in the very next article, speaking of the foreign trade of the United States, discussing something the New York *Tribune* had said about stimulating trade with Australia by subsidizing a steamer line between San Francisco and New South Wales, speaks of "our level-headed American neighbors, whose alertness has tremendously improved their foreign trade, and whose manufactures have even driven out those of the vaunted Free Trade communities."

Our esteemed young contemporary, *Hardware*, in discussing "ventilated ovens" for cook stoves, speaks of the gauze oven doors as attached to the Charter Oak stoves manufactured by the Excelsior Manufacturing Company, of St. Louis, as an "invention" originating with that concern. It quotes what the manufacturers say regarding this gauze oven door, and suggests:—"There may be good objections to advance against the ventilated oven as manufactured by the St. Louis company. The Canadian stove manufacturers have never been backward in taking hold of any good thing in their line; possibly they may see defects in the system; if so, it may account for their non-introduction here." It is true that Canadian stove manufac turers have never been backward in taking hold of any good thing in their line; and it is also true that one Canadian stove manufacturer at least has taken hold of the Filley gauze oven door, and applied it to what they call the Charter Oak stove made by them, an exact reproduction of that made by the St. Louis concern. We refer to Messrs. E. Coggswell & Co., Sackville, N.B. Mr. Giles F. Filley, of the Excelsior Manufacturing Company, the originator of the gauze oven door, does not claim it as "invention," but a "discovery."

The *Empire* shows great lack of familiarity with facts regarding the subject it discusses when, in taking the *Globe* to task for telling Quebec how much better off that Province would be as a State of the American Union, says:—"* * * Similarly delusive is the pretence that French would be recognized as their official language, for any such recognition would only apply locally, not to its use in the Legislature, the courts, the laws, the records and other documents of the central Government, thus differing widely from the situation in Canada." There is no probability of Quebec ever becoming a State of the American Union, but the *Empire* should know that the chief, if not only qualification, the constitution of the United States requires of a State on its admission, is that it shall have and maintain a Republican form of Government, nothing being therein said regarding the language to be used. If Quebec should ever become such a State, unless she had voluntarily previously relinquished the right to use the French language in local official transactions, she would have that right guaranteed to her; but it would be equally certain that with all Federal Government officials, and in all United States Courts, the English language would prevail to the exclusion of any other.

As the feasibility of the successful construction of the Chignecto ship railway become more and more fully demonstrated, different schemes are being advanced for making use of that remarkable engineering achievement. Parties are now obtaining estimates and gathering the detailed information necessary to carry into effect the scheme of establishing a line of steamers to ply between St. John as one terminus and the St. Lawrence and lake ports of Ontario and the United States as the other limit of the journey. It is proposed, if the results of further investigation should not change the aspect of affairs, to construct six to ten steel steamers of a special type suitable for navigation on the Gulf of St. Lawrence, and yet adapted to the canal system connecting the St. Lawrence with the lakes. These are to be screw steamers of about a thousand tons, rig ged also as sailing vessels and built very broad so as to be large carriers. They will cost at least $100,000 each. It is thought that this line of steamers may also be available for the West India trade, and in any case they will connect with the proposed West India line as well as with the American boats. For heavy tonnage such a line of steamers should, if the promoters can carry out their plans, secure a great part of the West India trade of Western Canada, and may fairly compete for that of the Western States as well. The Canadian system of inland navigation is a water road from the Atlantic Ocean not only to the St. Lawrence ports, but to Kingston, Toronto and all cities on the Canadian side of the lakes, ending at Port Arthur, within some four hundred miles of Winnipeg, while it leads also to such ports in the United States as Buffalo, Cleveland, Chicago and Duluth.

Speaking of the electrical transmission of power and the utilization of excellent water powers that go to waste either because buildings could not be erected on the banks, or the facilities for transporting goods were poor, the *American Miller* says:—

These and other disadvantages, which have prevented the development of valuable water power, are overcome by improvements which have been made of late in the methods of transmitting power by electricity. Water power is the cheapest of all powers, and as it can now be cheaply and economically distributed over extensive districts by electricity, it is very probable that it will be more extensively used than heretofore.

A plant has recently been put in near Virginia City, Nev., which transmits power over half a mile, and runs six electric motors of eighty horse power each. The electricity is generated by six dynamos of 130 horse power each, which are situated in a subterranean power station near the water power. The motors are arranged in a row parallel with the main driving shaft, to which they are all belted in the ordinary manner. By this plant it is claimed that seventy per cent. of the power applied to the shafts of the generators in the power station is delivered for work at the main shaft of the mill.

In Switzerland there are many water powers being utilized that it was impossible to use before the inauguration of the distribution of power by electricity. The plants there have proved very successful, and seldom need repairing. The cost of putting them in in that country is said to be about $5½ per effective horse power. There are many plants of 50 to 100 horse-power in use, and some of 200 and 300 horse-power. Practical electricians claim that at least 1,000 horse-power can be conveyed a distance of five miles with no difficulty.

In the United States there are many small motors being used, and there seems to be a much greater demand for them

than the large ones. There are innumerable mill sites throughout the country which can be utilized by this method, and the power distributed to as many different points as desired. It would seem that it is only a question of time when there will be a grand revival of water power establishments. Possibly the universal age of steam is a good deal further off than many have supposed.

During the fiscal year just ended the receipts of the United States were $388,000,000, and the expenditures $283,000,000; and the year closed with a surplus of about $104,000,000. During the recent Presidential campaign the Republicans declared that there would be no surplus of any account, and it was on this that they based their refusal to consent to a reduction of the tariff. Now that their prediction has proved untrue it remains to be seen whether they will alter their policy to meet the facts, and relieve the people of some portion of the enormous burden of taxation now borne by them. Last year the receipts from Customs duties were $225,000,000 or nearly three-fifths of the total receipts. As a large portion of this is money withdrawn from circulation and locked up in the Treasury as surplus, this fact alone is sufficient warrant for a reduction of duties.—*Toronto Mail.*

The *Mail* should blush to present these facts as an argument against a protective tariff. It states that the receipts of the United States last year were $388,000,000, of which $225,000,000 were from Customs duties. This would leave $163,000,000 as derived from internal revenues. The expenditures of the Government were $283,000,000, or $58.000,000 more than what was derived from Customs duties. In other words, all the income derived from Customs duties was required for the expenditures of the Government and $58,000,000 besides. The receipts from internal revenue are derived chiefly from taxes upon whisky and tobacco; and it is clearly to be seen that if this latter tax were removed, or reduced to the extent of $105,000,000, the receipts and the expenditures of the Government would be equalized. It should be understood that while the United States Government imposes taxes upon whisky and tobacco, it does not license the manufacture or sale of them; for it does not have the power under the constitution to do so. But the States have this power, and some of them use it; and the Federal Government can raise no objection to any action the States might take looking to the prohibition or regulation of these trades within their borders. Internal revenue laws never were and never will be popular in the United States; and when any material reduction of the receipts at the Treasury is made, it will be effected by removing or modifying the internal revenue taxes, not by abandoning the protective feature of the tariff laws.

In the five years 1884-88 there was collected on shipments from one American port to another, amounting to 677,966 tons, the sum of $135,592. At the rate paid on consignments to Montreal, the tax would have been only $31,307. On the other hand the toll charged on 788,095 tons of freight consigned to Montreal in the same five years was only $35,062, which amount would have been increased to $159,618 if the same rate had been charged as to American ports. There is in this statement complete evidence of intentional discrimination against the American receiving ports in favor of Canadian. Whether the discrimination is in controversion of the treaty of Washington is perhaps an open question.—*Brad streets.*

No doubt discrimination in favour, not of ports but of routes, has been made in order to attract to the St. Lawrence the export grain trade of the west, but such discrimination is not in controversion of the Washington treaty. Article 27 of that convention reads: "The Government of Her Britannic Majesty engages to urge upon the Government of the Dominion of Canada to secure to the citizens of the United States the use of the Welland, St. Lawrence and other canals in the Dominion, on terms of equality with the inhabitants of the Dominion." Terms of absolute equality exist. If an American vessel takes a cargo of grain from Lake Erie through the Welland and St. Lawrence canals to Montreal, the rebate of tolls is granted precisely as in the case of a Canadian vessel; while if the American vessel makes Oswego her destination, the full toll on the Welland canal is exacted, just as it is upon the cargo of a Canadian vessel destined to a Canadian port on Lake Ontario. For example, in the last five years 86,300 tons of grain passed down the Welland canal to Canadian ports between Port Dalhousie and Cornwall, upon which full tolls were paid, and Canadian carriers no more than American carriers enjoy a rebate unless the cargo passes down the full length of the St. Lawrence canals. In other words, citizens of the United States enjoy the use of the Canadian canals on terms of perfect equality with the inhabitants of the Dominion, as provided by the Washington treaty.—*Gazette.*

To show the failure of our canal policy to adequately produce the results expected to be derived from the generous expenditure made, it is necessary only to cite the fact that the traffic on the Welland canal is now principally between American ports. We appear, indeed, to have as yet simply convenienced the trade of the United States by the outlay on this canal. Look at the figures. In 1881 the quantity of freight passed through the Welland canal from the United States ports to United States ports was: Eastward 96,266 tons, westward 97,907 tons, or a total traffic of 194,173 tons; while in 1888, the figures were, eastward 221,064 tons, westward 213,689 tons, or a total of 434,753 tons. In seven years the purely American traffic through the Welland canal has increased by no less than 240,585 tons, or about 125 per cent. On the other hand the quantity of freight passed through the Welland canal to Montreal was in 1881, eastward 169,213 tons. westward 37,190 tons, or a total of 206,403 tons; while in 1888 the figures were, eastward 183,899 tons, westward 19,310 tons, or a total of 203,209; actually less than seven years before, as against an increase of 125 per cent. in American traffic. The total traffic of the Welland canal last season was 878,800 tons, and of this one-half, or 434,753 tons, was between American ports. Eight years ago the purely American traffic was only one-third as large as that from and to Canadian ports. These facts surely are worthy of more than passing notice, and the Government ought seriously to consider whether its canal policy cannot be remodeled to the advantage of Canadian ports and Canadian carriers.—*Montreal Gazette.*

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.

MR. J. THEO. ROBINSON, publisher, Montreal, has sent us "Steadfast; the Story of a Saint and a Sinner," just issued from his press. This delightful story is by Rose Terry Cook, author of "Somebody's Neighbors," "The Sphinx's Children," "Happy Dodd," etc., which fact will be guarantee that the possessor of "Steadfast" will have an enjoyable time while reading it. For sale at all the bookstores and news-stands.

THE Inter-Colonial Railway of Canada is the only direct route between the West and all points on the Lower St. Lawrence and Chaleur Bay; New Brunswick, Nova Scotia, Prince Edward Island, Cape Breton, the Magdalene Islands, Newfoundland and St. Pierre. Express trains leave Montreal and Halifax daily, and run through without change between these cities in 30 hours. The through express cars of the Intercolonial are lighted by electricity and heated by steam from the locomotive; and there are elegant buffet, sleeping and day cars on all these trains. The popular summer sea-bathing and fishing resorts of Canada are along the line of the Inter-colonial, or are reached by that route.

THE *Export World*, published monthly by Messrs. Coombs, Crosby & Eddy, 78 South street, New York City, comes to us materially changed in form and character from what it recently was. Originally it was only a statement of current prices of American goods, but now it is being developed into a commercial and technical journal which will evidently add immeasurably to its value. It may now be considered a reliable organ for presenting to foreign buyers statements of what is being accomplished in the arts by American ingenuity. Its editions are published in English, Spanish and Portuguese; and it aims to co-operate with other journals whose circulation is not largely in foreign countries, rather than to compete with them.

WE congratulate our artistic contemporary, the *Dominion Illustrated*, on the completion of its first year. It has fulfilled the engagement made twelve months ago with the Canadian public. Its engravings are always admirable, and its literary character is meritorious. We would call special attention to the series of contributions on Canadian industries in the issue for July 6—which begins a new year. The milling business—with special reference to the great firm of Messrs. A. Ogilvie—is the opening article of the series. The illustrations of the mills in Quebec, Ontario and Manitoba, and of the interiors, showing the machinery, make fine pictures. We wish the Dominion Illustrated Publishing Company success in this new enterprise, which should be encouraged. The last number (July 13) contains views of British Columbia and Alaska, and a portrait of the Hon. Senator Murphy.

MESSRS. HEINTZMAN & Co., manufacturers of the celebrated "Heintzman" pianos, have just issued a new illustrated catalogue descriptive of the instruments made by them, and also containing many pages of letters recommendatory of them from some of the most eminent musicians of the world. The book also contains lists of names of persons in Canada who have these instruments in use, the number of them amounting to several thousands, to all of whom the firm refer with and without permission, as regarding the satisfaction they feel in using these goods. Artotype portraits of the gentlemen composing this firm were recently published in this journal, and also a description of their extensive factory and its equipments, in which they manufacture these fine instruments. Mr. Heintzman, sr., although now in his seventy-fourth year, still employs the greater part of his time superintending the production of their pianos; for both he and his sons who are associated with him are all practical pianoforte makers.

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. J. A. CROSSMAN and J. A. Laws will build an iron foundry in Parrsboro', N.S.

THE saw mill of Isaac Rogerson at Blythe, Ont., was destroyed by fire July 4th, loss about $5,000.

MESSRS. PAGE & PATTERSON are building a new planing mill on Little Bob river, near Bobcaygeon, Ont.

MESSRS. CROZIER & BURCHILL, Merrickville, Ont., have begun the manufacture of brooms, whisks, etc.

THE Truro Hat Factory, Truro, N.S., are now giving employment to 32 hands, who turn out about 25 dozen fur and wool hats daily.

MESSRS. FOX & HAWKSHAW, Lucan, Ont., have acquired Hooper's grist mill at that place, and will re-model and fit it with roller machinery.

THE St. John Syrup Company, St. John, N.B., is being organized with $250,000 capital stock for the manufacture at that place of syrups, glucose, etc.

THE E. & C. Gurney Company, Toronto, are placing two of their new hot water heaters, with all necessary connections, in the hospital at Peterboro', Ont.

THE woolen and carding mills of Messrs. John Moody & Sons, Ridgetown, Ont., were destroyed by fire, July 11th, loss about $15,000. The works will probably be re-built immediately.

THE Philadelphia Gold Mining Co., North Brookfield, N.S., have contracted with Messrs. I. Matheson & Co., of New Glasgow, for a 20-stamp mill complete, with a 60 h.p. boiler, and an engine.

THE Moncton Cotton Manufacturing Company's mills at Moncton, N.B., are equipped with 11,000 spindles and 250 looms, give employment to 180 hands, and consume over 2,000 bales of cotton annually.

MESSRS. FRENCH & WEBSTER, Dresden, Ont., have just completed and put in operation their new hoop and stave mill. The machinery was supplied by the Waterous Engine Works Company, of Brantford, Ont.

THE Chatham Harvester Works, Chatham, Ont., have recently sent sixty-five of their single reapers to the Province of Quebec, and have thirty orders ahead. They are rushing the mowers out in great shape also.

MR. W. L. JOHNSON, late foreman of the Royal City Planing Mills at New Westminster, B.C., will erect an extensive shingle mill plant at Gambier Island, Howe Sound, B.C., with capacity to cut 50,000 shingles a day.

THE Canada Pipe and Foundry Company, Montreal, although but recently incorporated, are doing a large business, already having orders booked for about 2,000 tons of pipe of various sizes, the works being operated to their utmost capacity.

MESSRS. MILLS & SON, Merrickville, Ont., are manufacturers of furniture, their factory being 52x42 feet, two stories high. In addition to furniture they also manufacture broom handles, window poles, and many other varieties of turned work.

MR. W. B. MCALLISTER, of Pembroke, Ont., has purchased Messrs. Gillies Bros.' grist mills and important water power at Packenham, and intends to put in a complete set of roller process machinery, with a capacity of 200 barrels per day.

THE West-End Mining Company of Ontario has been incorporated in Toronto, with a capital stock of $2,000,000, for the purpose of conducting mining operations in the White Fish and Silver Mountain mining region, with headquarters at Port Arthur.

A CHANGE has been made in the management of the Stormont Cotton Mills, the late manager, Mr. Turner, having resigned. His place is filled by Mr. Greenwood, who was for several years in the Valleyfield Cotton Mills, and for two years past in the Coaticook Company's Mills.

THE woollen and knit goods factory of Mr. C. E. Stanfield, at Truro, N.S., is being run to full capacity manufacturing cardigan jackets, shirts, drawers, tweeds, etc. It contains four broad looms, 480 spindles, 24 knitting machines and one set of cards, and gives employment to 30 hands.

THE Nova Scotia Iron,.Coal and Railway Company, of New Glasgow, N.S., which was organized last month, will proceed immediately to prospec their iron properties, and if they are found of sufficient capacity, they will commence the erection of a furnace and other necessary plant.

THE Charles Stark Company of Toronto has been incorporated with a capital stock of $200,000 for the purpose of enlarging and carrying on the business heretofore conducted by Mr. Charles Stark in this city. This business includes the manufacture of watch cases, jewelry, sporting goods, etc.

MESSRS. HILL, HALE & Co., Montreal, have engaged in the manufacture of cardboard, surface coated, and the finer grades of writing papers, their factory being fitted with the best improved machinery. Mr. Hale has for several years been superintendent of the manufacturing department of the Canada Paper Company.

MESSRS. A. RAMSAY & SON, Montreal, are manufacturers and importers of white lead, paints, oils, colors, varnishes, etc., being the proprietors of the St. Lawrence White Lead and Color Works, that city. These works cover an area of over 24,000 square feet, and are equipped with the very best and most modern machinery and appliances.

THE Dresden Stave and Hoop Company, Dresden, Ont., during the past seven months manufactured an average of 80,000 staves and hoops on every working day, the product going chiefly to Buffalo, New York, and Jersey City, from which latter place they are shipped to consumers in Europe. They give employment to about eighty-five hands.

THE Dresden Hub, Spoke and Wood Bending Works, Dresden, Ont., is claimed to be the oldest concern of the kind in the Province which has never suffered removal or change of ownership. They give employment to fifty hands the year round, and are turning out 200 sets of wheel parts a day. The capacity of these works are to be considerably increased.

MESSRS. J. & T. COULON, who recently erected a large saw mill on Picnic Island, one of the Grand Manitoulin Islands in Georgian Bay, and which was first put in operation only a couple of months ago, are now cutting about 100,000 feet of lumber a day, giving employment to about 100 men. The mill building is 154x50 feet, and the machinery first-class in all respects.

THE woolen mill of Messrs Watchorn & Co., Merrickville, Ont., is a substantial stone building 76x40 feet, four stories high, with iron roof; and the dye house is 60x24 feet, 1½ stories high, also with an iron roof. It contains two sets of cards and ten looms, the products being etoffes, tweeds, flannels, yarns, etc. It is a flourishing concern, giving employment to thirty hands.

THE new works of the Royal Soap Company, Winnipeg, Man., have been completed and occupied. The main building is 100x50 feet, three stories high; the machiney is new throughout, and the entire works are to be heated by steam. To the rear of the main building is the engine room, in which are a fine new engine and boiler made at the Vulcan Iron Works in Winnipeg.

ANY one who would avoid the imputation of not knowing beans should read the prize paper by Helen Campbell in the number of *Good Housekeeping* for July 20. The subject is very thoroughly presented, especially the ways and means of using beans as food, and many who think they know beans pretty thoroughly already will be able to extract additional information from it.

THE Sanitary Engineering and Supply Company, Toronto, is a new concern recently organized, who propose by means of patent appliances to convert sewage, house refuse and garbage into a marketable manure, the effluent water to be discharged in a perfectly clear and bright state. The system can be applied to public and private institutions such as asylums, hospitals, colleges, etc.

MESSRS. MASON & RISCH, manufacturers of pianos, Toronto, have recently bought the plant of the Hamilton Vocalion Organ Company, at Worcester, Mass., and will remove the same to Erie, Pa., where they are erecting suitable buildings for carrying on the business on a large scale, and where they will give employment to about 100 hands. They will conduct their Erie business with a cash capital of $100,000.

MR. A. E. WYNN, of Ilkley, England, has invented a type writer which may be carried in the vest pocket, and which will be sold at retail at less than 10 shillings. It measures 3½x3 inches, and weighs about 4 ounces. It embodies a disc about the size of the face of an ordinary watch, in which the type is arranged. It has capacity to print a line from an inch to a yard long; any thickness of paper can be used, and any person of ordinary intelligence can use it.

MESSRS. E. R. MOORE & Co, St. John, N B., operate extensive nail factories both in St. John and Coldbrook, N.B., the combined capacity of which amounts to 110,000 kegs annually of cut iron and steel nails, railway spikes, ship spikes, tacks of all kinds, and shoe nails. Employment is given to between 90 and 100 hands. They recently closed a contract with the Coldbrook Rolling Mill Company of Coldbrook, N.B, to place their entire product with that concern.

THE Forbes Manufacturing Company, Halifax, N.S., is a new concern that make a specialty of manufacturing and repairing fine and accurate machine work and all sorts of special machinery. They also make an ice skate, recently invented by Mr. Forbes, for which patents have been issued in Canada, the United States, England and Germany. Most of the machine tools in use in this establishment were made by the London Machine Tool Company, of London, Ont.

ROBERT TAYLOR, whose expanding boot and shoe business compels him to enlarge his alrendy extensive factory, has given the contract for a large brick addition to his premises. It is to be 40x60 feet and five stories high, and is to be finished by October 1st. Mr. Taylor's factory will then be one of the largest, if not really the largest, in Canada. The work is to cost $7,500. On its completion about 100 men will be added to the already large force of workmen. —Halifax, N.S., *Critic.*

MR. W. E. LOSEE, of Victoria, B.C, who had the contract for building the fifty large coal cars for the Union mines, that Province, has completed his work. They were constructed after a model sent him from Pennsylvania, the woodwork being of Douglas fir, which is claimed to be equal to oak for this purpose. One half these cars were built in thirty-five days, and the balance in twenty-one days. As soon as the necessary iron work can be prepared fifty more cars will be built for the Union mines.

THE Charles Rogers & Sons Co., Toronto, contemplate making a considerable addition to their manufacturing premises. The increasing demand for their work render it necessary. They have recently completed a shipment of seven car-loads of furniture for Messrs. Hiram Walker & Sons' new summer hotel at Kingsvillle, Ont. The furnishings for the C. P. R's new steamer, Manitoba, are ready, waiting the completion of the steamer. Besides these they have other large contracts on hand which will keep them busy for some time.

MESSRS. T. MCAVITY & SONS, St. John, N B., manufacturers of brass goods, etc., are adding a two-story annex to their works which will greatly increase their facilities and enable them to take on about fifty additional hands, the number now employed being about 140. The annex will contain the dynamos and polishing and buffing rooms, and electro-plating works, and will be used exclusively in connection with these and plumbers' brass goods. Altogether the firm will then have about 50,000 square feet of floor space in their factory.

MESSRS. A. H. SIMS & Co., Montreal, have one of the largest and best equipped factories in Canada for the manufacture of shirts, collars, cuffs, etc. Their equipment includes a 120 horse-power Corliss steam engine, 2 steam boilers of 75 horse-power each, and more than $50,000 worth of special machinery, the establishment giving employment to about 750 hands. The capacity of these works is 2,500 dozen collars and cuffs, and 800 dozen shirts a day, and every detail of the work from taking in the raw materials to the finishing and packing for shipment is done on the premises.

THE Hochelaga Cotton Company, of Montreal, who have extensive mills at Hochelaga, Que, and who recently acquired the works of the Magog Print and Textile Company, at Magog, Que., recently purchased $150,000 worth of additional machinery for this latter works, which is now being placed, the expectation being that the entire works will be in full operation early in September. It is expected that not only the 700 looms in these works will be kept going on print cloths, but that the printing works will require the product of probably 500 looms more. There will be about 700 hands employed.

MR. FREDERIC NICHOLLS, of the Permanent Exhibition of Manufacturers, Toronto, has been appointed by Mr. Joseph Lea, Proprietor of the St. Thomas Fencing Works, St. Thomas, Ont., his

exclusive agent for the city of Toronto for the sale of his manufactures, which include wrought iron fencing, cresting, and all kinds of ornamental and architectural iron work of the latest and most artistic designs. These goods are made of the best material, in the most workmanlike manner, and are durable and well finished. Samples can be inspected at the Permanent Exhibition. Mr. Nicholls is prepared to furnish designs and estimates.

THE city of Toronto having asked for new tenders for the steel pipe required by the waterworks department, Mr. W. H. Law, of the Central Bridge Works, has secured the contract for the 48-inch steel pipe at $7.06 a foot. Mr. Abell, of Toronto, got the contract for the 60-inch pipe, his tender being three cents a foot lower than Mr. Law's—very close figuring. Mr. Law's contract includes a large amount of work, amounting to about $30,000, and the manufacture of steel pipe will be something new here. The Central Iron and Bridge Works have been steadily growing and new machinery will be added for this steel work.—Peterboro, Ont., *Review*.

MESSRS. J. R. WOODBURN & Co., St. John, N.B., proprietors of the Victoria Steam Confectionery Works of that city, manufacture all grades of goods in their lines, giving employment in the busy season to about 50 hands. Mr. Woodburn is the inventor of a pulverizer which was awarded a diploma and silver medal at the Provincial and Dominion Exhibition, London, Ont., 1885. This machine is designed for pulverizing granulated sugar, starch, cream of tartar, etc., to impalpable powder. It will pulverize from 3,000 to 9,000 pounds of sugar in 10 hours, according to quality wanted; and from 10,000 to 12,000 pounds of starch a day. It is patented in Canada, Great Britain and the United States.

MR. ROBERT LITTLE, of Cypress River, near Winnipeg, Man., has invented a machine for sewing up the mouths of bags when filled with flour, grain, etc. The bag is sewed with wire instead of twine, thus reducing the cost, and the work done is in every way as perfect. The bag being placed in position, by a single draw of a lever the wire is taken off spindles along the length of the machine, cut into lengths about an inch long, and each length made into a staple, which is driven through the cloth and clinched. The mouth of the bag is doubled up; thus the staple is driven through four-ply of cloth. The staples are about an inch apart. Mr. Little has secured patents on his invention in Canada and the United States.

THE Toronto Rubber Company, Toronto, of which Messrs. Thos. C. McIlroy, jr., & Co. are proprietors, have been rushing business during the past few weeks, both at home and abroad. Among the large shipments made have been 2,000 feet of Eureka fire hose and waggon to Victoria, B.C.; 2,000 feet of Eureka fire hose and other supplies to Vancouver, B.C.; 2,500 feet of fire hose to Sherbrooke, Que.; besides fire hose and a large quantity of other goods to the Imperial Navy Yards at Halifax, N.S., and to the city of Winnipeg. In addition, the city of Toronto and the town of Dundas have each been supplied with hook and ladder trucks of the latest and most improved pattern, and Paragon fire hose, while on Saturday an order was also received from Victoria, B.C., for a five thousand dollar Aerial truck.

MR. GEORGE LANG, leather manufacturer, of Berlin, Ont., and president of the Board of Trade of that town, had a close call and a fortunate deliverance from death a few days ago. Requiring some medicine he stepped into a drug store and asked for ten grains of quinine, but was given ten grains of morphine in mistake, which he took immediately and left the store. He walked up street, and the mistake was not noticed until the clerk was putting the bottle on the shelf, when he observed the label and immediately ran after Mr. Lang and informed him of the blunder. Dr. Lackner's office was at once sought, where, after administering emetics and the application of the stomach pump, Mr. Lang was pronounced safe, but sank immediately into a deep sleep and had to be walked around for some time before he recovered consciousness.

MESSRS. BROWNLEY & Co., St. John, N.B., manufacturers of brass goods and specialties, have formed a company in Chicago, Ill., under the name of the Brownley Brake Shoe Company, who will handle in the United States the Brownley brake shoe recently invented and patented by Mr. Brownley. This invention consists simply in having grooves in the face of the brake shoe used on railway and street cars, which allow sand and grit to escape, avoiding the usual great wear on both the shoe and the wheel. Messrs Brownley & Co. manufacture several other specialties invented by Mr. Brownley, included in which are the Brownley automatic cylinder lubricator for locomotives, by which 30 per cent. of oil is saved; the Brownley journal box, by which heating is prevented; the Brownley roller bush, for ships' blocks and semaphore sheaves, etc.

MR. T. L. CLARK, of Montreal, claims to be the only bell manufacturer in Canada who makes a full line of wrought metal bells. He is also an extensive manufacturer of fancy and plain brass hardware and plumbers' supplies. Among his special machinery are two large stamp power presses and five power drop presses. The former are very powerful and handle the heavy stamping for gongs, sleighs bells and brass hardware. They are self-adjusting, and will operate any size or kind of die. The drop-presses stamp the metal into any desired shape. There are also twelve other presses used in the manufacture of sleigh bells. Other products of these works include gongs, team bells, carpet plates, stair buttons, stair corners, door handles, door pulls, shutter bars, sash lifts, etc. Mr. Clark originally started in the nickel-plating business fifteen years ago, and began the manufacture of bells about nine years since.

AT Edmonton, a coal seam four feet thick crops out on the south bank of the Saskatchewan, forty feet above the water. A small quantity has been mined from it; but lately Mr. Donald Ross has run a drift into the north bank through a mass of quartzite pebbles slidden from above. The seam consists of three feet of good workable coal, overlain by about one foot of dark clay shale, which is again overlain by a considerable thickness of impure coal. It has not been found advisable to work this upper part of the seam, but it forms a very good roof for the drifts and rooms. The coal is bring used in Edmonton at different forges and throughout the town generally. It burns well, both in stoves and in open grates, making a clear hot fire, and when stored under a roof can be kept for a long time in a perfectly serviceable condition; a quantity of this coal which had been lying in a shed for a year was still in lumps of fair size, and when burned made an excellent fire.—*Mining Review*.

THE Dodge Manufacturing Company, Mishawaka, Ind., have recently instituted one of their rope transmissions of power in the mills of the Knoxville Woollen Mills Company, Knoxville, Tenn., which illustrates the scheme by which a single rope is made to drive twenty counter shafts, and each countershaft two ranks of looms. The main driver has twenty grooves, and to avoid the necessity of using wide wheels on all the countershafts, every fourth one is set a little higher than the other and performs the office of bearer for all the parts of the rope which pass beyond it. Thus every fourth wheel only is a bearer, and the number of grooves diminish by three as they recede from the driver. The remaining wheels require but one groove each. This is the most perfect and compact drive for a large number of similar machines which has ever been devised, and if the Dodge Manufacturing Company, who originated and patented the American system of power transmission by ropes, had brought forth only this one scheme, it would have been sufficient to secure them lasting reputation. The Dodge Wood Split Pulley Company, Toronto, are the Canadian manufacturers of this system of transmission of power.

A COMPANY has recently been formed at Worcester, Mass., to introduce a new chemical fire pail which was patented last November. Since the building of large factories, calls for some means of self protection, and for the purpose of putting out incipient fires, a great variety of portable extinguishers have been placed on the market, but this last applicant for public favor possesses many points of superiority which recommend it to general use in mills and factories. This pail is made of glass, and is therefore rust proof, neither can it dry up and fall to pieces. It is covered with a corrugated tin jacket, open at the top. The pail is hermetically sealed by a soft tin foil cover, preventing evaporation, and this cover is protected by a tin cover, which is automatically removed when the pail is in use. The pail is filled with two gallons of chemical liquid, which has been thoroughly tested, and is highly recommended by insurance companies and mill owners. To use it it is only necessary to break the tin foil cover and throw the contents on the fire, creating a gas which extinguishes it at once. After it has been once used it can be refilled and again sealed.

THE Chatham Manufacturing Company, Chatham, Ont., are requesting the attention of all interested to the two-horse spring lorry manufactured by them. As will be seen by the illustration in their business card, this vehicle has 4-inch arms, 4x½ inch tire, and capacity for the carriage of a four ton load—"the best and easiest running lorry made in Canada." This lorry is made with and without springs, and is sold at greatly reduced prices, regarding which correspondence is solicited. Alluding to the conveniences the Chatham Manufacturing Company have for the construction of their vehicles, they inform us that they have two mills—a band saw mill for sawing short logs, and a gang saw mill for cutting ship plank and stock. The woods indigenous to the country in the neighborhood of Chatham are among the best in the world for wagon-mak-

ing purposes, and whenever an extra good log is hauled into either of these mills, it is sawn into wagon stuff and piled out to season. The company have their own foundry, care being taken to use only the very best Scotch pig iron ; and the superintendent of the works, Mr. Milner, is an old and practical workman and a large stockholder in the company.

THE Dake Engine Manufacturing Company, Grand Haven, Mich., have sent us a number of blue prints representing and descriptive of some of the machinery manufactured by them. Among these are a high speed hoist, in which the load is controlled entirely by one lever, and which lifts and holds the load at any point, and starts the load easily from any point, there being no dead centres—a powerful hoisting engine occupying but very little space. A combined hoist and winch, for use on vessels and barges, a floor space but 40x22 inches, and has capacity to lift 4,000 pounds. A builder's hoist embodies steam boiler, engine, drum, etc. A print shows the working parts of an engine, in which there are only three moving parts. The pistons act as valves for each other ; no bolts or nuts inside the engine, and nothing to become disarranged. This engine is described as being economical, powerful and durable. Steam can be cut off at any point of stroke and used expansively for the balance. Can be run at high speed with but little vibration, and are well adapted for use with blowers or fans, with direct attachment to fan shaft. The company will give further information on application.

THERE is now at work near Linlithgow, Scotland, an electrical installation for pumping water which has some very interesting features. The motor and pump are situated at Kingscavil quarry, near Linlithgow, where they raise water to a reservoir at a height of 135 feet, the water being forced through a distance of 600 yards of two inch pipes. The quantity of water raised has not been stated, but the pumps are double acting plungers at 2½ inches diameter, designed to work at about 40 revolutions to the minute. The dynamo is situated in the engine room of the Linlithgow Oil Co., at a distance of fully a mile and a quarter from the quarry, so that the power is transmitted electrically over 4,000 yards of cable. This not being an underground case, the cables are naked and are carried by insulators on telegraph poles. The E. M. F. at the dynamo terminus is 250 to 300 volts, and the current 11 to 12 amperes, the output being thus about 3,000 Watts, or about 4 h.p., and a margin of 30 to 40 per cent. over present requirements has been allowed for future use. This is a small installation, but will serve as a demonstration of what can be accomplished. It works satisfactorily, and requires no attendant at the pumping house at the gangway.

A CLASSIFICATION of the different industries conducted by Messrs. J. Harris & Co., St. John, N.B., include the building of railway cars of all descriptions, chilled car wheels, Washburn peerless steel-tyred car wheels ; car, machine, mill, ship, and all other styles and kinds of castings, steam engines, mill and other machinery. At their rolling mills they make nail plate, street and mine rails, ships' iron knees, hammered car axles, shafting and shapes, and all other kinds of bar iron, and in all their works they give employment to about 400 hands. Regarding these industries, they have been in continuous and successful operation ever since the establishment of them in 1828, when they were started by Messrs. Harris & Alland, to whom the present proprietors are successors. The demand in the earlier years of the existence of this concern was necessarily small, but was met with that promptness and satisfaction to the trade which has been a guiding principle throughout the sixty-one years of its career. With the growth and development of the Maritime Provinces, the introduction of and extensive railroad building throughout this and other sections of Canada, the facilities for getting out large work were immediately improved, and the manufacture of cars and car wheels was introduced.

MR. FREDERIC NICHOLLS, Toronto, sole manufacturer in Canada of the Batten patent balcony fire escape, publishes a list of the hotels, factories, public buildings, etc., in which this escape has been erected, and regarding the advantages of which he draws attention to the following :—

That the balconies are made of the best wrought iron, of any ornamental design or pattern, and securely bolted through the walls. Can be made any length or width. The brackets and flooring are capable of bearing any number of persons standing on them. The ladders, with wide steps and of easy grade, can remain down permanently, or folded up, as desired, showing the ornamental balcony only in sight, which does not mar the architectural beauty of the building, and can be instantly released when desired. No ice or snow will remain on them, neither will the working parts rust ; and they will work admirably in any weather. A stand pipe is also connected for high buildings, with valves at each door and on the roof. These escapes have been fully tested at fires and proved themselves invaluble for saving life and property. Iron guards on windows of Asylums and Reform Schools can be so adjusted as to be instantly released in the case of fire by the unfolding of ladder or sounding of a gong. For situations not requiring a balcony escape, Mr. Nicholls also manufactures straight-iron ladders which he quotes at reasonable prices.

THE Hibbard Electric Manufacturing and Supply Company, Montreal, of which Mr. W. C. Hibbard is the chief dynamo, claim theirs to be first and only factory in Canada that has extensively adopted the use of electric motors for operating their machinery, as well as furnishing electric power to other manufacturing establishments ; there being but one other plant similar to this, that being in the United States. The products manufactured by this concern include an endless array and numberless combinations of mechanical devices, tools, etc., for the manufacture of electric light wire, aerial, submarine and underground cables for telegraph, telephone and electric light ; rubber covered wire, magnetic wire, office and annunciator wire, lead encased wires and cables, telephone and incandescent lamp cords, electric cordage, also telephone annunciators, electric bells, fire alarm, burglar alarm and gas lighting apparatus and other electric supplies of every description. These works have been erected and equipped with all the latest improved designs in the line of machinery and tools for getting out electric supplies, and are run by four electric motors of 25 horse power. They have already in daily operation within a radius of an eighth of a mile of their new plant a dozen motors of 35 horse-power, besides an extensive distribution of their electric lighting among the merchants of that locality.

MESSRS BINGHAM & WEBBER, Toronto, the popular printers of Canada, "whose work speaks their worth," and who make business catalogues a specialty, have just finished and delivered an edition of 25,000 copies of the organ catalogue of Messrs. W. Bell & Co., of Guelph, Ont., which cost upwards of $5,000, another edition of the same catalogue of the same quantity and price to follow immediately. The cover, which is a very beautiful and suggestive chromo-lithograph, is the work of the Toronto Lithographing Company, but the inside, including all the designs, and all the work in connection therewith, is the work of Messrs. Bingham & Webber. Without doubt this is the finest catalogue ever published in Canada, and it is equal in every respect to any ever published anywhere else. Messrs. Bell & Co. have always been liberal advertisers, and know full well the value of printer's ink when judiciously and properly distributed; and being artists themselves, and knowing the superior value of high class and truly artistic work, in ordering this catalogue gave the printers *carte blanche* to use their own taste and judgment in the selection of all the materials and designs to be embodied therein. The book itself tells how well placed this confidence was—how well Messrs. Bingham & Webber have fulfilled the expectations of Messrs. Bell & Co. in the matter.

THE indications are that the mineral deposits of the Lake of the Woods region are to be developed at last. The question of titles having been settled and everything made clear for the safe investment of capital, a company has come forward to establish works for treating ores, and promise to be turning out bricks of gold within three months. Mr. Henry J. Power, who has been interesting himself in the scheme and who has just returned from Chicago, says that he has arranged to erect chlorination works at Rat Portage, for the purpose of treating all kinds of gold and silver ore, even when the latter is carrying up to fifteen per cent. of lead. By the chlorination process the ore is crushed, then pulverized, then subjected to electrified terraced plates, after which it goes through the pans, then through the agitators and finally concentrated. This process is repeated until the gold or silver is thoroughly separated from the ore. The plant necessary for the works is not very expensive, but is complete and will have capacity for all the ore that can be supplied Mr. Power has arranged with companies owning mines to begin developing in time to have ore on hand by the time the mills are finished. Mr. Power is a practical miller, and has had experience either as proprietor, manager, miller or assayer in Michigan, the Black Hills, Colorado, Utah, Wyoming, New Mexico, Texas, Arkansas and other places. He believes that the minerals in the Lake of the Woods have good values and will give a good return. The people of Rat Portage have voted $10,000 to aid the new works.—*Mining Review.*

A WISCONSIN inventor has discovered what he claims to be a practical and cheap method of using water as fuel. The appliance consists of nothing but a piece of gas pipe from two to six inches in diameter, as may be desired, and of convenient length to fit a cook stove or a parlor or other heater, with short legs or stable support to keep it in position. This is placed in the stove, with one end

slightly projecting, to which is attached a vessel of water with stop cock conduit from the water vessel into the pipe. Before reaching the steam chamber the water passes through the important part of the invention, the part that constitutes or contains the great discovery. By means of it the water may pass into the steam chamber, while the steam cannot pass out. The part of the pipe containing the steam chamber is within the stove, although a small part may be without if desired ; to this the heat of a moderate wood or coal fire is applied, so as to heat the steam to a high temperature, say 300° or 400°, when it passes out of a small orifice immediately into the midst of a bed of coals or flame from burning wood or coal, when it is at once raised to the required temperature, 400° or more, to be immediately decomposed into its gases—oxygen and hydrogen—which instantly become flame. Only a moderate summer fire of wood or coal will be required the coldest day in winter, the gaseous flame furnishing the balance of the heat needed in the coldest room. The capacity for reducing heat may be regulated to suit requirements. When it is known that hydrogen flame yields a heat in burning five times greater than carbon, or about 2,000° to 2,500°, one may form some idea of the capacity of this little contrivance for producing heat By increasing the temperature of the gas pipe to about 400° the vapor may be decomposed into its gases before exit from the pipe, and in such cases it is emitted in a jet of blue flame. In either case the oxyhydrogen flame is easily produced and with a very small consumption of fuel.

THERE will be on exhibition at the Electrical Exhibition in St. John, N.B., next week, an electrical welding apparatus, which will undoubtedly excite a great deal of attention among manufacturers. It is used for the welding, tempering, forging, and shaping of all sorts of metals by electricity. The principle involved in the art of welding by this machine is that of causing the electricity to pass through the abutting ends of the pieces of metal which are to be welded, thereby generating the heat at the point of contact, which becomes the point of greatest resistance, while at the same time mechanical pressure is applied to force the parts together. As the currents heat the metal at their junction to the welding temperature, the process follows up the softening surface until a complete union of the weld is effected, and as the heat is developed in the interior of the parts to be welded, the interior of the joint is as efficiently united as the visible exterior. By this method it has been found possible to accomplish not only the welding of iron and steel, but also of metals which have formerly resisted all attempts at welding and have had to be either brazed or soldered. Wrought iron, silver, copper, brass, lead, tin, zinc, German silver, platinum, gold and even cast iron are not only welded by this machine to each other, but different kinds of metals can also be welded one to another. In this way the applications of the process can be applied to many combinations with the attainment of results heretofore found impossible in metal working. The tensile strength of the welding is shown by the mechanical tests made by the United States Ordnance Department which are all that could possibly be desired. Prof. A. E. Dollbear, of Tufts University, in an article published in the *American Engineering Record*, says: "I have made nearly 100 tests of the tensile strength of electrically welded bars of iron, iron and steel, and other metals. The results were of such a character that I can state positively that it is possible to weld both wrought iron and steel so that the weld is as strong as the same cross-section on any other part of the bar. The appearance of the fracture is fibrous for iron and generally granular for steel. The strength of this granular steel is as high as 125,000 pounds per square inch. I had a number of bars welded by an expert blacksmith and a number of similar ones by the electric process placed before me for comparison, with the result that the electrically welded bars were found to be much stronger than those welded by the ordinary process. The bars were of various sizes up to an inch and a half for iron and three-quarters of an inch octagon steel." The work done by this machine is: (1) joining of wires of copper, iron, brass, and other metals of different shapes and sections ; (2) making joints at angles with bars such as "T" and "Y" angles ; (3) making chains with double welds, both joints being formed by one operation, ranging from cable wire to jewelers' chains and combining the different metals ; (4) constructing or joining end to end pipes of all kinds, the welding in of "T" connections or elbows of pipes, thus making it available for natural gas and petroleum springs ; (5) welding of rings, ends of hoops, casks, barrels, carriages or wagon ties, mending broken tires, hoops or bands, welding rings, etc. ; (6) uniting steel with iron in the manufacture of agricultural implements, dies, tools, etc. ; (7) repairing tools, mending broken shafts, lengthening rods of brass, screws or bolts ; (8) welding of cast iron pieces used in the construction of machinery, building up of frames of carriages, sleighs, and similar work.

THE Merchants' Cotton Company, Montreal, are making valuable alterations and improvements at their cotton mills at St. Henri, Quebec. Another story is being added to the extension of the main building; new boilers are being placed, and considerable new machinery is being introduced, included in which are fifty looms, which fill out the capacity of the works. It is the intention of the company to begin the manufacture of a line of fabrics never heretofore made in Canada.

THE American Steam Compress Fish Company, of Halifax, N.S., employ a patented process invented by Mr. Cathcart Thompson, who has secured patents therefore in Canada and the United States. The company alluded to make a specialty of preparing codfish for market, the first process being the removal of the skin. After this process is completed they are passed immediately upon an endless belt moved by steam power, and are taken to the fourth floor, where they enter the steamers, eight in number, and each holding 600 pounds of fish. They remain in the steamers twenty-five minutes, which loosens every bone in their bodies, when they are ready for the next move, which carries them to the bone pickers, which extract all the bones. From this division of the work the fish reappear upon an endless belt, and is moved rapidly along to the shredders, which reduces the fish to small fibrous shreds. It is now ready for the hydraulic press, which is located conveniently at this point, where a portion of the water it has accumulated on its passage is extracted. From the hydraulic press it continues on its journey by another endless belt which carries the fish to shredder No. 2, where it is again manipulated, and from thence it passes via the belt system to a steam-heated kiln sixty feet long. During the continuous movement through this kiln, for it never stops, it is dried and passes on to the steam packer, where the fish is pressed into one pound boxes. These boxes are then packed into cases of forty pounds each, ready for export to any market in the world. By the use of recently invented machinery, this company are enabled to manufacture out of wood pulp the air-tight boxes in which their fish is packed.

THE GATE CITY STONE FILTER.

THERE is no greater blessing than good water. Men have lived without food for forty days, but no man ever abstained from water for more than nine days and survived. Good water is a source of health and vigor; bad water is a prolific source of disease and death. The very highest authority on hygiene asserts that "this much seems to be certain: that as precise investigations proceed, and, indeed, in proportion to the care of the inquiry and the accuracy of the chemical examination, a continually increasing class of diseases is found to be connected with the use of bad water."

The most dangerous impurities in drinking water are the so-called disease germs. The best authorities hold that certain diseases, known as zymotic diseases, are propagated or transmitted by a peculiar class of low organisms, which find their way into the system through channels of air, food and water, mainly by water. Of these diseases, malarial fevers, typhoid fever, scarlet fever, cholera and diphtheria are the most notable. It is believed by many who have studied these subjects, that typhoid fever, scarlet fever and diptheria will never attack those who habitually use, for all purposes, properly filtered water.

A perfect filter should be so constructed of such materials that every part of the filter can be easily gotten at for the purpose of cleansing; that the purifying medium shall not receive into its pores the filth it extracts; that the filtering medium and the whole construction of the filter shall be lasting, and require no change of substance or condition; and that when ice is used, it must have a separate ice chamber, to keep the ice and its disease germs from the filtered water. The Gate City stone filters, fulfil all the above requirements. They are simple in construction. The jars to hold the water are made of hard gray stone ware and genuine china. The filtering medium is a natural stone, cut into discs, and so arranged that all the water passes through it into the lower jar perfectly pure. These filters are easily cleansed, and never become cracked or crazed by change of temperature in the water. The stone forming the filtering disc is mined from the earth, and is different from any other stone. It does not absorb impurities and become foul, as they never penetrate it, but lie on the surface, and internally the stone remains as pure and white after years of use as when taken from the mine. The separate ice chamber saves ice, and the water is cooled without the risk of disease germs, which lie hidden in almost all the ice now used.

The Gate City filters, as made in all the desirable styles and sizes, are on exhibition and sale at the Permanent Exhibition of Manufactures of Mr. Frederic Nicholls, Toronto. To those who cannot make it convenient to make a personal inspection, descriptive catalogue and prices will be sent on application.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Post Office, &c., Strathroy, Ont," will be received at this office until Friday, 19th July, 1889, for the several works required in the erection of Post Office, &c., Strathroy, Ont.

Specifications can be seen at the Department of Public Works, Ottawa, and at the office of C. Grist, Esq., Strathroy, on and after Friday, 28th June, 1889. and tenders will not be considered unless made on form supplied and signed with actual signatures of tenderers.

An accepted bank cheque, payable to the order of the Minister of Public Works, equal to *five per cent. of amount of tender*, must accompany each tender. This cheque will be forfeited if the party decline the contract, or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

By order,

A. GOBEIL,
Secretary.

Department of Public Works,
Ottawa, June 22nd, 1889.

THEO. H. EATON & SON, Windsor, Ont.; Detroit, U. S. A.—Carry full line of Pure Dyeing Drugs, Dye Woods and Extracts adapted for the requirements of Woollen and Cotton Manufacturers. **Paper Makers' Anilines** and Chemicals Address the **Detroit** Office.

DOMINION DYEWOOD AND CHEMICAL CO., Manufacturers.—Pure Dyewoods, Dyeing Drugs. Sole Agents. English, German, and French Aniline Dyes, for Woolen, Silk, Paper, and Leather manufactures.

Edge Tools, Saws and Hardware.

WELLAND VALE MANUFACTURING CO.—Lock No. 2, St. Catharines, Ontario, Canada. — Manufacturers of axes, scythes, forks, hoes, rakes and edge tools.

H. R. IVES & CO., Montreal. — Hardware manufacturers and founders; iron railing and ornamental iron work a specialty.

Emery Wheels.

PRESCOTT EMERY WHEEL CO., Prescott, Ont.—Manufacturers of emery wheels, grinding and polishing machinery with patent improved cushioned journal bearings, tool grinders with water, twist drill grinders, and other emery wheel machinery.

Gloves.

W. H. STOREY & SON, Acton, Ont.—Manufacturers of fine gloves and mitts in every variety and style.

Hoists and Elevators.

LEITCH & TURNBULL, Canada Elevator Works, cor. Queen and Peter Streets, Hamilton, Ont.—Patent Safety Hydraulic, Hand, and Power Elevators. Telephone connection.

Hubs, Spokes, Handles, Etc.

F. W. HORE & SON, Hamilton, Ont.—Manufacturers of wheels, wheel material, shafts, poles, etc.

COWAN & CO., Galt.—Manufacturers of every description of wood working machinery.

THE DOMINION SNATH COMPANY Sherbrooke, Que.—Manufacturers of Patent Swing Socket, and every variety of Scythe snath.

Machine Tools.

JOHN BERTRAM & SONS, Dundas. — Machine tools and wood working machinery. Toronto wareroom, 58 Yonge St. Agents—The Polson Iron Works Co. Montreal wareroom, Craig St. Agents for Quebec—The Machinery Supply Association, Montreal.

Malleable Iron.

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

SMITH'S FALLS MALLEABLE IRON WORKS, Smith's Falls, Ont. Manufacturers to order of **refined** malleable iron castings. Agricultural and other castings a specialty. Carriage castings in stock.

Knit Goods.

S. LENNARD, SONS & BICKFORD, Dundas.—Manufacturers of plain and fancy hosiery

Oils.

McARTHUR, CORNEILLE & Co (successors to John McArthur & Son), Montreal.—Afford best value in pure olive and lard oils, also in all other leading lines of vegetable, animal, and mineral oils for factory use. Invite special attention to their celebrated crown diamond "engine" and "machinery" oils.

Paper Manufacturers.

WM. BARBER & BROS., Georgetown—Manufacturer of book and fine papers.

THE TORONTO PAPER MANUFACTURING CO., Cornwall, Ont.—Manufacturers of engine sized superfine papers, white and tinted book papers, blue and cream laid and wove foolscaps, account book, envelope and lithographic papers, etc., etc.

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THEO. H. EATON & SON, Windsor, Ont.; Detroit, U.S.A.—Supply at lowest prices all Chemicals used by Tanners and Wool Pullers. Special Anilines for Sheep Skin Dyers, Wool Mat Manufacturers, etc., etc. Address correspondence to Head Office, Detroit, Mich.

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B. GREENING & CO., Hamilton, Ont. — Perforators of zinc, iron and steel; manufacturers of wire cloth all grades, wire ropes, bank and office railings, etc.

TIMOTHY GREENING & SONS, Dundas Ont.—Wire manufacturers and metal perforators, wire cloth all grades, perforated sheet metals of every description, all kinds of special perforating and indenting to order.

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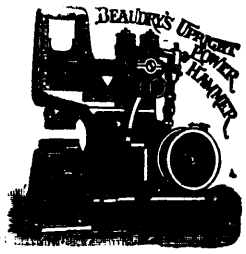

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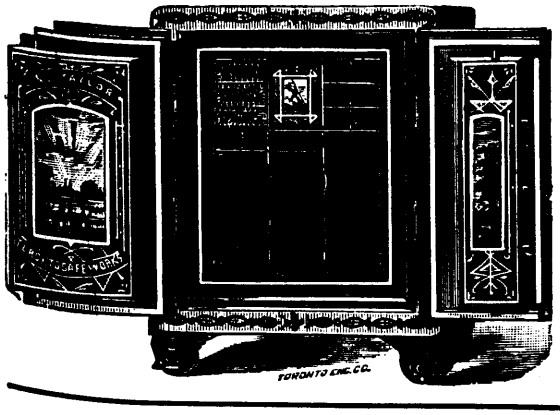

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Double Tongue and Groove FIRE-PROOF

SAFES

(Patented January 14th, 1886.)

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All our new style Fire-proof Safes are fitted with **TWO COMPLETE TONGUES AND TWO GROOVES** on both the door and door frames, which effectually prevent the heat from passing between the door and rame into the interior of the safe.

They are also fitted with **CHILLED CHROME STEEL PLATES** under the Lock and Bolt Spindles to prevent drilling; and have **DRY AIR-CHAMBER** inside to prevent dampness to papers.

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D. POTTINGER,
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Railway Office, Moncton, N. B., 2nd July, 1889.

Card Clothing,

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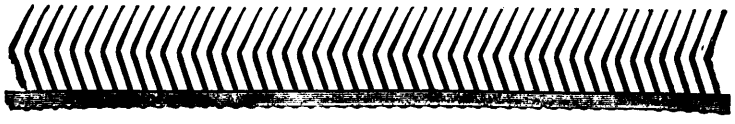

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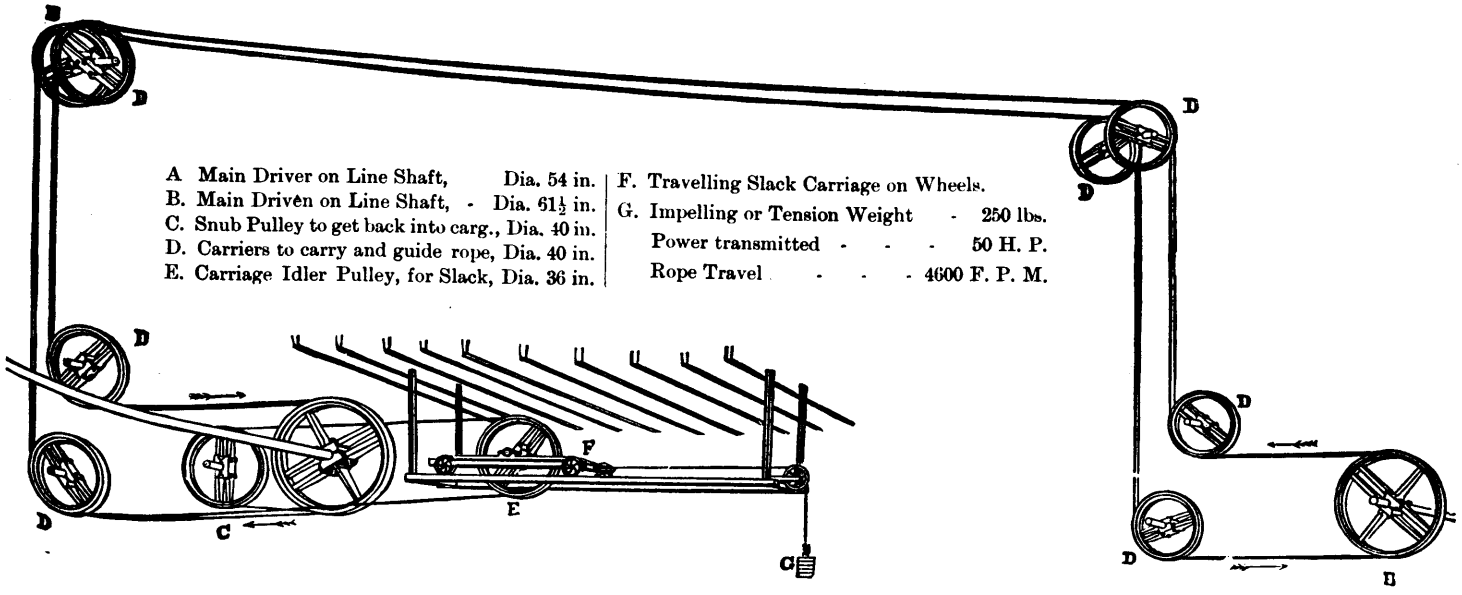

A Main Driver on Line Shaft, Dia. 54 in.
B. Main Driven on Line Shaft, - Dia. 61½ in.
C. Snub Pulley to get back into carg., Dia. 40 in.
D. Carriers to carry and guide rope, Dia. 40 in.
E. Carriage Idler Pulley, for Slack, Dia. 36 in.
F. Travelling Slack Carriage on Wheels.
G. Impelling or Tension Weight - 250 lbs.
Power transmitted - - - 50 H. P.
Rope Travel - - - 4600 F. P. M.

The above illustration shows the Dodge System of transmitting power by manilla rope and grooved hard wood pulleys, as manufactured and erected by Dodge Wood Split Pulley Co., Toronto, and demonstrates fully the practicability of the system. That it may be clearly understood and appreciated, we give the following description:

A transmission similar to the above was erected and started up in September, 1886, and has been running constantly ever since, conveying the power (50 H. P.) to drive a line shaft on the opposite side of the street.

This shaft is on a parallel line with the main line or power end.

In order to avoid obstructing the street it was necessary to go back from the power end and up through the upper stories of the main building over idlers, then across the street into the upper story of the building where the power is to be used, then down again into the lower story, where is located the driven shaft.

The transmission is a very simple one and consists of a series of wood split pulleys, and best quality of tallow laid manilla rope. The power is taken from the main line, making 280 R. P. M. Referring to the Cut, A represents the driver and is 54 inches diameter with two grooves. B, the driven, is 61½ inches diameter with two grooves, located, as stated, in a building on the opposite side of the street, about 125 feet from the driving end. The idlers, D, are of 40 inches diameter, and each has two grooves, and the carriage pulley is 36 inches diameter with one groove.

A journal containing valuable suggestions to those who would apply rope in place of belting for the transmission of power over long distances, with thirty illustrations and much special matter relating to this, the most perfect system ever devised for transmitting the power of a prime mover to distant machinery, sent free on application to the

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