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Vol. 37.

TORONTO, DECEMBER 16, 1898.

No. 12.

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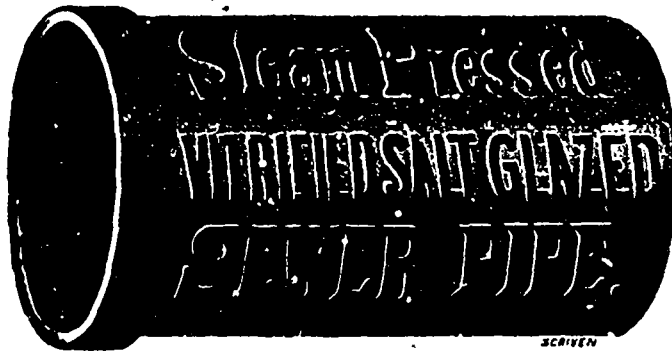
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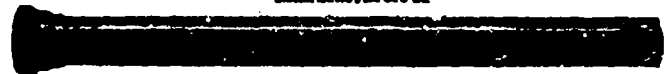
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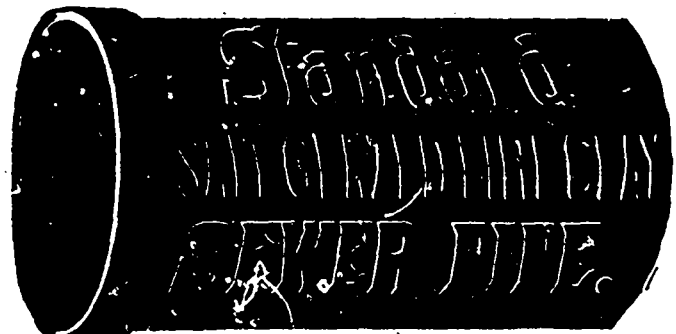
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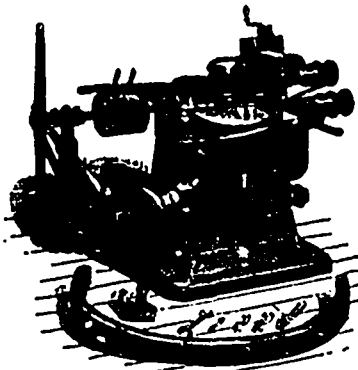
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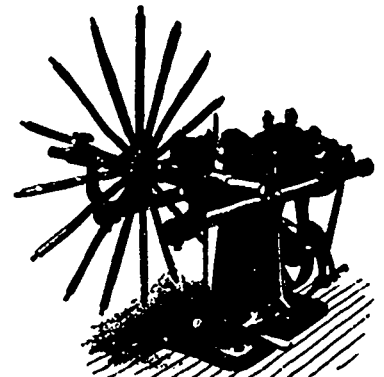
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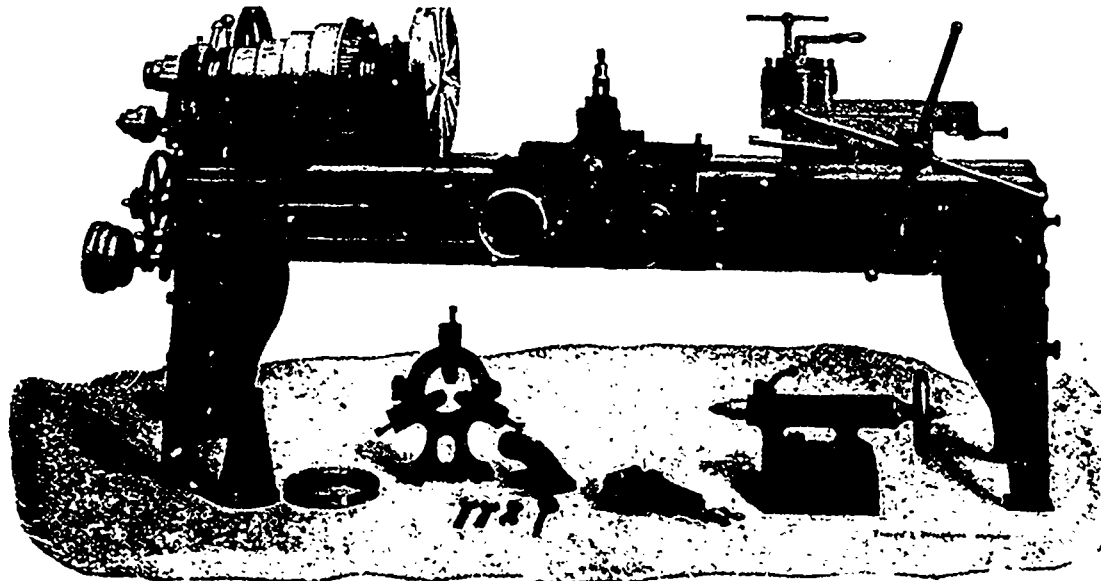
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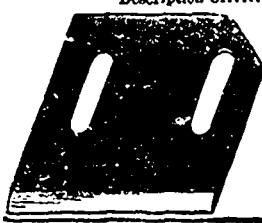
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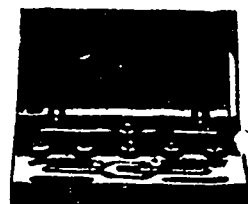
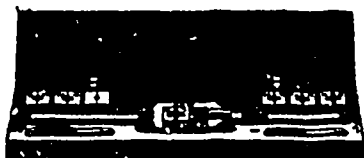
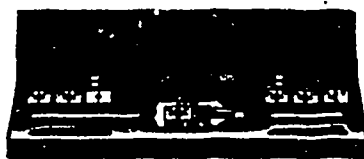
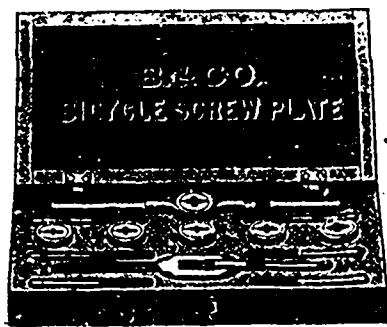
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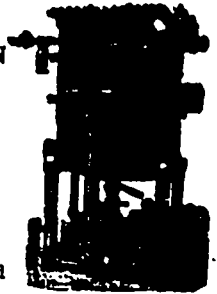
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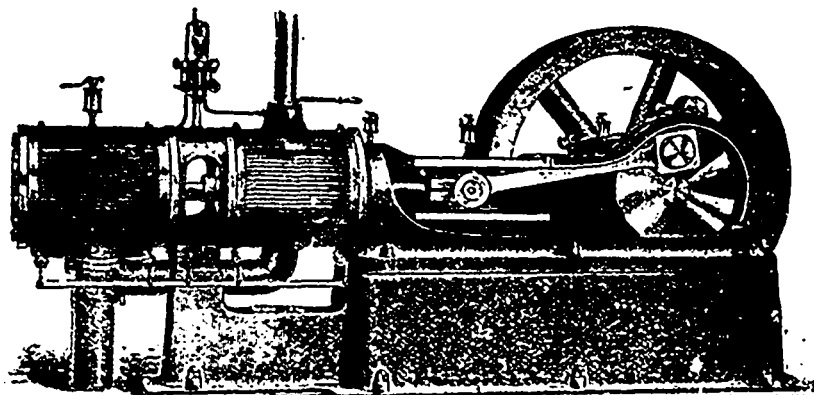
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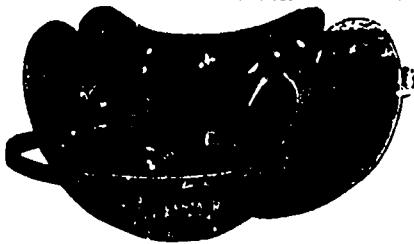
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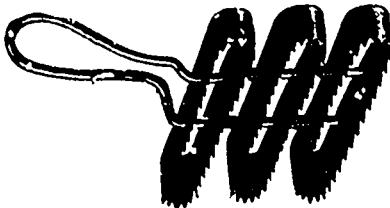


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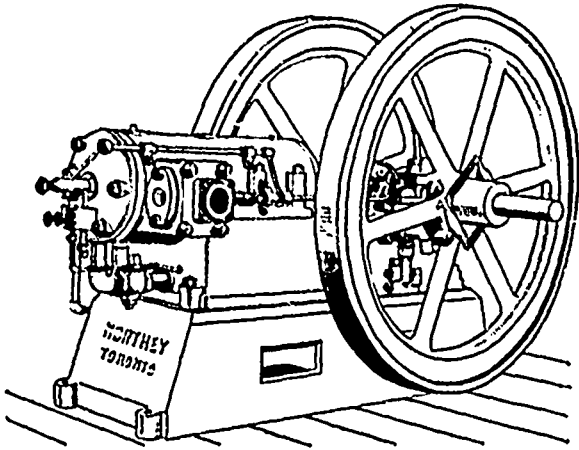
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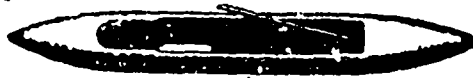
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During the Dominion general election's campaign of 1896, The Toronto Globe found much pleasure in denouncing the National Policy, which was the policy of its political enemies, and in advocating free trade, which was the policy of its political friends, and it supplemented its fighting force by the addition of a poet, one of whose sweetest effusions was as follows:

The taxing men, corruptionists, the tyrants and their tools,  
Coerce, oppress, and gather pelt by wretched tariff rules.  
God bless the cause, the righteous cause, for which Reformers pray,  
And when the N. P. mockery shall all be swept away,  
On Canada, fair Canada, shall dawn a brighter day.

When The Globe's party came into power, it found a tariff in force that had been very carefully constructed along the lines of the National Policy, and it found Canada in a most flourishing commercial condition as an effect of that policy. It was through gross political blundering that The Globe's party obtained power, and certainly not through any widespread desire on the part of the people for free trade or anything approximating thereto; and notwithstanding the efforts of The Globe and the previous promises of its political friends, the new Government as soon as it felt the reins of power firmly in its grasp, hastened to declare that, while some of the incongruities of the tariff would be corrected, the manufacturing industries of the country generally, need feel no apprehension that their interests would suffer. And with a few exceptions these promises have been kept.

As in the past, the smiles of Heaven have been bestowed upon Canada most benignantly. The efforts of the husbandman have been rewarded with bounteous crops, and the continued prosperity of the country has created demands for all

sorts of goods that require the most active exertions on the part of producers to supply. Indeed, Canada is experiencing a growing time that makes glad the hearts of us all.

This demand, however, could not have been responded to so quickly and effectively had it not been that the manufacturers felt a gratifying degree of confidence that there would be no vicious meddling with the tariff; and it is an object of this article to show that where the tariff has not been tampered with the growth and expansion of our manufacturing industries have been very great, and that where adverse tariff changes have been made, no such expansion is to be observed.

It is quite evident, too, that the pains of parturition that The Globe's poet experienced in bringing into the world the abortion that he had hoped would be a healthy, promising child, were caused more by the eructations of flatulency than by that divino afflatus that usually inspires more generous souls.

The new Government having inherited a first-class, genuine article of National Policy tariff, from which, as it well knew, the country would not countenance any material deviation, The Globe starts out with a desire to appropriate what eclat it can for its party by endeavoring to show that the growing time is attributable, not to the National Policy tariff, but to changes in it that the Government has not made, nor which it is at all likely to make. In carrying out this idea of appropriation, it has sent its correspondents and reporters into many of the manufacturing centres of the country, who tell with much attention to detail of the progress being made in foundries, workshops, factories and other hives of industry.

This departure on the part of The Globe would be very praiseworthy indeed if it did not, in alluding to the matter, say things that Ananias would have been ashamed of, and that exhibits a most remarkable economy of truth. Thus, in referring to the conditions of industry in the Province of Québec, it says:

The state of affairs thus revealed is worthy the attention of those who predicted that the least interference with the tariff would precipitate a collapse along the whole line of industry. No such collapse has taken place, nor is any threatened. Instead we find on all hands preparations being made for the increase of buildings, the improvement of machinery and the exploitation of new foreign markets. It is an extremely superficial view of trade which imagines that all that is needed to build up a successful industry is to give it high protection. As every man in business knows, the prospect of immense profits under such conditions attracts a greater amount of capital than the volume of demand will warrant. Over-production follows, and the last state of that industry is worse than the first. The cure generally resorted to is monopoly. As all cannot live and thrive, it is agreed to let a portion die—for a consideration. The product from those that are allowed to live is carefully proportioned to the market. When this stage is reached, a rest-and-be-thankful spirit takes the place of business watchfulness and activity. All interest in the march of manufacture, the discovery of new processes, new machines, modern ideas, is stifled, and before very long it becomes quite true that the industry could not without its high protection keep up competition for a moment with its foreign rivals. Indeed, at length it gets so far behind the times that it can scarcely hold its market even within the lofty walls reared up for its protection.

The Globe's facts and its political contentions fail to agree

in the following, speaking of the cotton manufacturing industry, it says:

The cotton companies, with their great capital, are probably better situated than others to meet the changed conditions, that is to say, to make up for a decrease of profits on a small production by multiplying these smaller profits with a large production. The Dominion Cotton Mills Company, which owns nine mills in different parts of the country, has adopted, under the able management of Mr. C. R. Whitehead, a policy of concentration as far as possible, and of modernizing and bringing thoroughly up to date all the various plants. For this reason the old mill of 250 looms at Coaticook was closed, but the capacity of the print works at Magog has been more than doubled. The company has erected at Magog an extension 165 feet long by 100 feet wide and three storeys high. This will increase the capacity of the mill from 600 to 1,300 looms; will increase the number of employes by 500, and will increase the output from 22,000 pounds to 46,000 pounds per week. The company has found a splendid market for its goods in Australia. The Dominion Company has also added 300 looms to its Hochelaga mill, chiefly for shirts and sheeting, and this will give employment to an additional 200 hands. It also intends to remodel the bleaching and finishing departments. Following out its policy of concentration, the company has erected a machine shop 100 feet long and 70 feet wide, at which the repairs for all the company's mills will be made. This will give employment to an additional 40 men. Heretofore the mill has been run by steam power, but the company has made a contract for a term of years with the Royal Electric Company at a remarkably cheap figure, and the whole of the enormous plant will be driven by the falls on the Richelieu river at Chambly, 16 miles away. Upon investigation by the new management, the Kingston mill was found to be so far behind the times that it was necessary either to go to a great expense in modernizing it or to close it altogether. After negotiations with the Kingston Council the company decided, in consideration of exemption from taxation for 20 years, to bring the mill thoroughly up to date, and to double the capacity of the carding and spinning departments. One feature of the renovation will be the installation of the Northrop automatic loom, to which reference is made elsewhere. The Montmorency Cotton Company and the Riverside Cotton Company, which were owned by practically the same shareholders, combined about four months ago, increasing their capital by \$100,000 and making it half a million dollars. The company is spending \$250,000 in enlarging its mills. The output of the Montmorency mill will be increased by 5,500,000 yards of cloth per annum, and the number of employes will be increased by 100. This mill, which was erected in 1889, has been regarded as the model mill of the continent, but Mr. Whitehead, the manager, is always on the watch for improvements, and has introduced the Northrop automatic loom, which will be run day and night. The entire product is for the export trade, the company having found profitable markets in China, Japan and Africa. The capacity of the Riverside yarn mill will be increased by 1,000,000 pounds per annum, and 150 employes will be added to the pay roll.

The Montreal Cotton Co. has added to its great mills at Valleyfield a new mill for the spinning and weaving of fine cloth. The main building of the new mill is 160 feet square, five stories high, each storey being sixteen feet in height. There is also an "L" of five stories, 180 feet long and 80 feet wide. The company is also building a warehouse 220 feet by 80 feet and four stories high, capable of storing 10,000 bales of raw cotton. The roof of the new mill will be completed this month. The machinery will be installed in December, and the new plant will be in operation in February. About 500 hands will be employed in the new mill, and as there are about 1,500 operatives in the old mill, fully 2,000 employes will be at work in both. This new mill is chiefly for the production of fine yarns at present imported from abroad, principally from England, and when it is completed

the wages which were sent to other countries to pay for those goods will go to building up the thriving town of Valleyfield. The company's pay roll is now about \$15,000 per fortnight, but when everything is completed it will amount to over \$20,000 per fortnight. The company's selling agents, Messrs. Stephenson and Blackader, are in Montreal. Mr. A. F. Gault, the President, Mr. Biglow, of Hopedale, and others have organized the Northrop Loom Co., for the manufacture of the loom of that name, which, it is claimed, will increase production about 25 to 30 per cent. As it is largely automatic the number of employes at that class of work will be greatly reduced at the same time. This loom is expected to revolutionize the cotton industry. The company has erected a fine building of brick and stone 260 feet long and 60 feet wide, and a foundry about 120 feet square, and will be ready for work early in December. This new enterprise will employ about 100 men, and already has enough orders on hand to keep it busy for a year and a-half. The Merchants' Cotton Co. at St. Henri has just completed an extension 275 feet long, 95 feet wide, with five floors, at a cost of \$350,000. The present mill employed 900 hands. The extension will employ 350 hands more, making 1,250 in the whole mill. The looms will be increased from 1,500 to 2,300, or, calculating by spindles, the increase will be from 54,000 to 84,000. The wages will be increased from \$4,500 to \$7,000 per week. The steam plant, which is now 1,800 horse power, will be increased by 1,200 horse power, making 3,000 horse power, and it might be added that it will include the largest rope drive in Canada. The company not only sees an opportunity of increasing its business in the present lines, but intends to make a specialty of duck and fancy goods. The Canadian Colored Cotton Co., which has one mill each at Merritton, Hamilton and St. Stephen, N.B., and two at Cornwall, and controls the output of another Hamilton mill and also of the Gibson mill in New Brunswick, reports that there is a considerable increase in the output of fancy goods, but that the output of staple goods, which form the greater part of its business, remains the same. The number of hands is about the same, but there is a considerable increase in the output owing to the introduction of improved machinery. At St. Stephen, for example, the mill has been entirely remodelled with the most improved machinery for the manufacture of fancy goods, such as ginghams, zephyrs, lawns, etc., which formerly were imported. The mill at Merritton has been completely overhauled for the manufacture of cotton blankets and certain classes of nap goods which hitherto have been imported. In the other mills the machinery has been modernized, and consequently there is a greater production at less cost.

We desire The Globe to observe that the policy of the National Policy still protects the Canadian cotton industry. It tells us in one place that it is an extremely superficial view of trade which imagines that all that is needed to build up a successful industry is to give it high protection, and that the prospects of immense profits under such conditions attracts a greater amount of capital than the volume of demand will warrant, and yet it shows in another place, as above, that under the protection given the industry by a National Policy tariff of 25 per cent. continued to it by The Globe's own party, the development has been phenomenal and exceedingly gratifying. There is a very pronounced monopoly effected in the bringing under one management so many of the cotton mills in the country, and yet the "rest-and-be-thankful" spirit that The Globe says is always characteristic of monopolies is not observable in this, for it is shown that expansion with it is the order of the day, even to the capture of markets in China, Japan, Australia and Africa. In it we do not see any lack of business watchfulness and activity, nor do we find any want of interest in the march of manufacture, the discovery of new processes and new machines, nor is there any stifling of modern ideas.

## PROTECTION DOES IT.

In "The Growing Time" department of The Globe appears the following :

The specific duty on oilcloth was removed at the last tariff revision, and this made a material reduction in the amount of protection, but the Dominion Oilcloth Co. promptly set to work to meet the new conditions. A serious factor in the cost of production is the amount of labor required to stamp or print patterns on the cloth in the ordinary method, that is, by hand. The company found that a printing machine had just been perfected to do this work, and immediately bought one. It then became necessary to erect a building for the new printing machine, and to remodel the rest of the factory to suit it. Altogether about \$75,000 was spent in the past year and a-half on new plant. This printing machine, which is a beautiful piece of mechanism, will do as much in one minute as a man can do in an hour; that is to say, that the new method is 60 times as effective as the old. This, however, has not lessened the number of employes, which remains about the same as two years ago, namely, 160, because the enormous increase in the capacity of the plant has necessitated the employment of more manual labor in all subsidiary departments.

The change of duty on oilcloth spoken of was from specific to ad valorem, and the rate of protection is now 30 per cent. There is no free trade in this.

It also has the following to say regarding the manufacture of woollens and woolen goods :

The Dominion Woolen Manufacturing Company, whose mill at Beauharnois employs about 200 hands, has increased its business by 15 to 20 per cent. This is largely due to the Klondike trade, but to some extent also to improvement in general business. It is too early yet to say what effect the preferential tariff will have upon woolen factories. The Excelsior Woolen Mill is practically a new industry. It occupies the premises of the Globe Woolen Mill Company, which made a disastrous failure about three years ago, owing to bad management. The plant was bought in by some of the creditors, and completely remodelled and modernized, and the business was resumed under the name of the Excelsior Company. For the past nine months the mill has been running full time, employing 110 hands, and the output for the first year will reach \$200,000. The prices obtained are said to be low, as, owing to the preferential tariff, Huddersfield goods are coming in and interfering with the business. One of the company expressed the opinion that the Government should have made the woolen duty 35 instead of 30 per cent. The company is engaged in the manufacture of the better class of goods, and, in common with other mills, finds that the demand for such goods is increasing, as the people are sick and tired of low-quality goods.

The Fit-Reform Clothing Company is a new industry. For many years Messrs. E. A. Small & Co. were in the wholesale clothing business, but finally came to the conclusion that there would be money in making what are practically custom-made clothes on a large scale and selling direct to the customer. They therefore erected a large four-story brick building, 130 feet deep, with 90 feet front, at the corner of Beaver Hall Hill and Latour street. In a year and a half the Fit-Reform business has increased so largely, and the prospects are so encouraging, that they intend to confine themselves to it entirely, and are rapidly getting out of the ordinary clothing business, which, of course, is being absorbed by other firms, and adding to their trade. The Fit-Reform Company employ about 450 hands, the most of whom were brought from the United States, as it was impossible to obtain here the necessary amount of skilled labor in that particular line.

This speaks well for the woolen industry of Montreal. The Globe shows that under the preferential tariff and an ad valorem duty, cheap, shoddy goods are being brought into

Canada that ought to be kept out. But protection keeps the mill going.

Speaking of an important industry at St. John's, Que., The Globe says :

There was no change in the duty on silk but the Corticelli Silk Company of St. John's finds that its business has increased fully 25 per cent. in the last year. This is certainly an indication of "good times," as its products are luxuries and not necessities. The company manufacture trimmings, threads and braids, but it is also now experimenting on piece goods. For the convenience of its customers it imports and sells piece goods, but it has now at work a few looms on this class of cloth. If the experiments turn out successful the company will at once enlarge its business by manufacturing instead of importing piece goods. It was in this "tentative" way the company originally started at St. John's on thread, and the town may be sure of an extensive addition to its industries if the experiments with these looms end satisfactorily.

No change of duty—silks, 25 per cent.

The Globe alludes to the iron industry of Montreal as follows :

The Lauric Engine Company report that for the past six months its business exceeded the corresponding period of the previous year by 50 per cent. It now employed 200 men, as compared with 150 three years ago, and is working a night as well as a day gang. It extended its premises a few years ago, but now for the first time the company is working up to its full capacity, and the prospects are that business will increase still more in the next six months.

The Montreal Rolling Mills Company also show progress during the last two years. The company has made considerable additions to its plant, the capacity of wire mill and wire nail machinery having been increased by at least one-third. Of course, the year 1896 was a dull year in expectation of tariff changes, and the output was smaller than in 1895, but, making allowance for this, the output in 1897 was, relatively, larger than in 1896, and the production of 1898 will exceed the previous years. In comparison with 1896 the value of the product will be about 25 per cent. less, that is to say, that owing to the changes in the tariff and the great competition that exists now in the manufacture of iron and steel, the consumer is getting the goods produced by this company on the average very nearly one quarter less than was paid a couple of years ago. At the same time the output of the mill has increased, and the number of employes have increased from 550 in 1896 to about 600 this year. The pay roll, however, has increased in a greater proportion. The scale of wages has remained the same, but the men are paid strictly by piece-work in the rolling mills, and as the output of the mills has increased, the total wages paid will be larger.

The Canada Iron Furnace Company, the Montreal Car Wheel Company and the Montreal Pipe Foundry Company have sprung from the Radnor forges near Three Rivers. The iron found there has been worked for 200 years, but owing to the energy of Messrs. Drummond, McCall & Company, the industry in the past fifteen years has grown to huge proportions, and these three companies now employ between 1,100 and 1,200 hands. As compared with two years ago the number of employes is about the same. The furnaces which are at Radnor have an annual output of about \$300,000, which is the same as two years ago. The car wheel company, whose works are at Lachine, shows a slight decrease in business, but the pipe foundry, also at Lachine, is working about one-third more than two years ago.

Mr. Edgar McDougall, manager of the Caledonia Iron Works, said that in the past two years they had completely overhauled all their plant; that they had twice as many men employed, and were doing twice as much work as two years ago—that, in fact, he was too busy to afford time to enter into particulars.

The James Cooper Manufacturing Company, manufacturing mining machinery, has doubled the capacity of its machine

shop in the last two years at a cost of about \$55,000, and has increased the number of employes from 90 to 140, and the fortnightly pay roll from \$1,100 to \$1,900.

The Dominion Wire Rope Company, of which Mr. James Cooper is also president, has increased its business from 15 to 20 per cent., although the number of employes remains the same.

The Robert Mitchell Company, brass and iron founders, report that this year's business is the best they have had in seven years, and about 50 per cent. ahead of last year. They have just completed a three-story addition for office and store room, and have added about 50 per cent. to the capacity of the foundry. The branch which shows the greatest increase is the manufacture of gas meters, which, after a long struggle, are now accepted as equal, if not superior, to those of English manufacture. The number of employes remain about the same as two years ago, namely 225, and the great increase in the business done is due chiefly to improved machinery.

The Thomas Davidson Manufacturing Company, manufacturers of enamelled ware, stamped ware, lithographed tin boxes, etc., report that their business is increasing every month. They have just remodelled the greater part of their factory, added a couple of stories to several of the buildings, and installed a quantity of new machinery at a cost of about \$40,000. These improvements will increase the capacity of the factory by about one third. The number of employes is now 600, an increase of 50 in the last two years.

The Dominion Bridge Company, whose works are at Iachine, found the present year the banner year of its history. This was due partly to the extensive changes on the Victoria bridge and other bridges of the Grand Trunk Railway, and partly, also, to the general increase of structural work throughout the country. The number of employes remains about the same as two years ago, namely 225, but the output has greatly increased owing to improved machinery.

All these are protected industries, as follows:

Engines.....	25 per cent.
Rolled iron.....	\$7 per ton.
Bar iron.....	\$7 per ton.
Pig iron.....	\$2.50 per ton.
Machinery.....	25 per cent.
Enamelled ware.....	30 per cent.

The paint, glass and allied industries are thus spoken of:

The Canada Paint Company, has increased its business about 20 per cent. as compared with two years ago. There are now about 120 employes, which is an increase of nine or ten as compared with the corresponding time last year, causing also an increase of about \$100 per week in wages. The company has made a number of improvements in various branches, chiefly in the direction of concentration and getting greater results for the same or less expense. For example, it now runs many of the grinding mills in series, instead of independently, thereby greatly reducing the amount of labor for the same output. The company has also, in the last year, gone into the manufacture of colored inks for job printing.

The North American Glass Company, a few months ago, increased its capital from \$500,000 to \$1,000,000. It makes blown glass exclusively, and finds that prices have gone down, as a result of tariff changes, but is still doing a good business, and with the increased capital intends to enter into the manufacture of some new lines. It employs about 500 hands, which is about the same number as two years ago.

Protection to these:

Paints.....	25 per cent.
Printing ink.....	25 per cent.
Glassware.....	30 per cent.

Some other protected industries are thus alluded to:

There is not much change in the flour milling business. The output and the number of employes are about the same. Mr. Robert Meighen, president of the Lake of the Woods Milling Company, says that there have been considerable additions to the milling capacity of Manitoba. Mr. W. W. Ogilvie has

erected on the city mill property, part of the Gould estate, a new 2,000,000 bushel elevator, and intends to rebuild the Gould mill.

Messrs. C. Galibert & Sons, manufacturers of leather and gloves, report an increase of 20 per cent. in their business in the past two years. They have extended their factory and now employ over 100 hands. Although they are doing more business Mr. Galibert says that their profits are not as large and that the tariff ought to be raised in order to keep out American goods.

Mr. Labatt, vice-president of the St. Lawrence Sugar Refining Company, said that there had been no increase of business, but if anything a slight decrease, in the past two years. The number of employes, however, remain about the same.

The Canada Paper Company has doubled its capacity in the last two years. To the Springvale and Windsor Mills it has just added the St. Francis, a magnificent new mill, capable of making 25 tons daily, and costing about \$250,000. The company now employs about 300 hands, an increase of about 100 in the past two years.

The Rolland Paper Company, whose mills are at St. Jerome, has made extensions and improvements, at a cost of \$25,000 to \$50,000, in the past two years, and now employ 180 hands, an increase of about 30. Like many other companies, instead of continuing to make a variety of lines, it has given up the coarser grades of paper and is concentrating on the finer qualities of linen goods, and while for this reason there is not yet an increase in the total volume of business as compared with a couple of years ago the business generally is reported to be satisfactory.

Messrs. Colin McArthur & Co., manufacturers of wall paper, recently completed an extension about 50 feet square, three stories high, with basement, in order to make more room for self-rolling machinery and other labor-saving devices, and have thereby added 25 to 30 per cent. to the quantity of their output in the past two years. The prices obtained are lower, but this is equalized by increased production. The coloring and pattern cutting departments, which are special features of this factory, are working to their full capacity, and the company has also been compelled to build an additional storehouse. The number of employes—86—has remained about the same. The company is working overtime on account of a rush of business.

These articles are protected as follows:

Flour.....	60 cents per barrel.
Gloves.....	35 per cent.
Sugar.....	1 cent per pound.
Paper.....	25 per cent.
Wall paper.....	35 per cent.

We are also told: The Canadian Rubber Company reports that there is a material increase to its business, and that the volume is satisfactory. Competition, however, is very keen, owing to the numerous rubber factories in Canada, and profits are not as satisfactory as they were in former years. The company has built a small extension to make more room for the plant which was too cramped. There are about 1,000 employes. The number is the same as two years ago, but owing to a considerable increase of business they are now working overtime and consequently the pay roll is larger.

The Granby Rubber Company, of Granby, has just built an extension 200 feet long, 42 feet wide, and three storeys high, added a considerable amount of new machinery, increased its engine power, and added about 40 per cent. to the capacity of the factory. It employs from 500 to 700 hands, and this number shows an increase in proportion to the increase in the capacity of the factory.

The Ames-Holden Company, manufacturers of boots and shoes, with five branches in different parts of Canada, and a factory in Victoria, B. C., reported that their business is prosperous and that it shows a considerable increase in the past two years, but did not care to give any details.

George T. Slater & Sons report an increase of 50 per cent. in their volume of trade over that of two years ago. They

attribute this growth to improvement in the goods, their unique method of doing business and to newspaper advertising. To their business system and advertising they ascribe the fact that they are the only specialists making one kind of shoes in Canada.

Protection to Rubber goods.....35 per cent.  
Boots and shoes.....25 per cent;

The Globe reports Mr. Slater as saying :

"Were it not for the 3,000 and odd dollars we had to pay in duty on the \$10,000 worth of machinery we have put in during the last year, we could afford to divide more with the operative," Mr. Slater remarked. "We are contemplating an extension of our business. There is a big field for our class of goods in England, and capitalists, who believe that as well as we, have approached us with propositions to turn the business into a stock company, with the idea of operating there, and we are considering it. That is a sensible provision in the tariff providing for a rebate on foreign material entering into export goods, and if the Government would make a similar provision on the machinery and lasts on which the goods are made we would then be on an even basis with American manufacturers, who have already captured a tidy bit of English trade. The remission of these duties, I am confident, would result in a great foreign expansion of the Canadian shoe trade, as it would encourage many manufacturers to adopt American machinery, who have not already done so."

If Mr. Slater is reported correctly, he is one of a class who wants to receive all of the benefits of protection and begrudges any of them to others where it does not work to his direct advantage. He speaks enthusiastically of the excellence of American machinery, well knowing that that excellence was attained only under the high protection tariff of that country, and that if Canadian machinery is not equally as good, it can never become so except under similar conditions. Mr. Slater would never have become the prosperous manufacturer he is had it not been that his industry was well protected, and now, after having become so well established in his business that he thinks of engaging in export trade, he is desirous of kicking from under their feet the support that protection gives to those who manufacture the machines that he uses.

This same selfish feeling is shown in Mr. Slater's approbation of the law that provides for a rebate on foreign materials entering into the production of goods made for export, and a desire to have that law extended so as to include shoemaking machinery and lasts on which shoes are made. It is not surprising that the present Government continues in force an abominable law that it inherited from the previous Government—a law that was put into force under a mistaken idea, and that has worked great damage to more than one Canadian industry. It might be well in some instances to admit duty free manufactured articles of a kind that are not produced in Canada, but when such articles as enter into the production of other articles, as for instance, shoe machinery, lasts, etc., are the products of Canadian industry, no such rebate should be allowed. The law is very vicious in this respect and should be amended.

#### FLIES IN THE OINTMENT.

Of course it was impossible for The Globe to inspect and enumerate many of the flourishing industries of Montreal and not discover that to some of them the situation was anything but flourishing, and that it was not their growing time. But it omits to tell that the industries into whose ointment flies had fallen were entirely of those upon whom the heavy hand

of tariff reform had been laid. Speaking of the once prosperous enterprises from which protection has now been withdrawn, it continues :

There are, however, a few flies in the ointment, and the savour comes chiefly from barbed wire and binder twine. The Dominion Wire Manufacturing Co. was hit pretty hard by the tariff changes. The galvanizing and barb wire departments are shut up, and the wire department is partly closed. The result is that 150 to 175 men have been thrown out of employment. "A wreck" is the expression the manager of the Consumers' Cordage Company used in describing the condition of its business. It owns ten factories in different parts of Canada; has a capital of \$2,500,000, and used to employ 1,500 to 1,800 hands when running at full capacity, with a yearly pay roll of \$200,000. To-day every factory but one is closed up; 1,200 ropemakers are out of employment in Canada, and many of the best of them have left for the United States. "We must have protection," said the manager, "or we cannot live. For the first two years after the company was formed it paid a 10 per cent. dividend. Then, in 1895, the duty on binder twine, which forms two-thirds of the product of the company, was reduced for 25 to 12½ per cent. inflicting a severe loss on the company, owing to the largely increased imports from the United States. Since then the company has not paid a dividend, and last year after binder twine was made free the whole of the machinery employed in this industry was idle, and, of necessity, the employes were discharged. Last year there were about 7,000 tons of binder twine used in Canada. The Consumers' Cordage Company made only 1,500 tons, instead of the whole amount, as it could have done if the protection had not been removed. It has been said that the duty was removed because the farmers wanted cheap binder twine. Well, in the first place, one farmer does not use as much binder twine in one year as he uses cotton or sugar in one week, calculating both in dollars and cents. Yet the duty on cotton and sugar is about 30 per cent. I do not mention this as an argument for the removal of these cotton and sugar duties, but merely to show how fallacious is the statement that the farmer is crying out for the removal of the duty on binder twine. In the second place, the removal of the duty has not resulted in cheapening the price. In my long business experience I have always noticed that when a country does not produce a certain article the foreign manufacturer controls the price of it in that country. Mexico, for example, has no cordage factory, and it is the best market that the American manufacturers have. Similarly here, the American manufacturers, when they found that we were unable to compete with them, their products being admitted free, while we had to meet a duty of 45 per cent. on similar twine going into the United States, shoved up the price in Canada. The average price of binder twine to the Canadian farmer in 1896-97 was six cents per pound, but last season, when our factories were not running, the average price was nine cents per pound. It is true that the raw material comes from the Philippine Islands, but the war had very little effect on the price of the finished article last season, as, of course, the manufacturers imported their raw material long before the war. Formerly we shipped about one third of the twine which we made to the United States, but the Dingley bill closed that market to us, and to make matters worse the present Government has thrown open our market to the Americans—about two-thirds of the product of our company are binder twine. The balance, about one-third, is cordage. We would be satisfied with the present reduced duty on cordage provided we could retain the Canadian market for twine, but this it is impossible to do without protection on twine. Being compelled to close two-thirds of the plant of the company, we cannot run the balance at a profit. We have the best machinery in the world. We have good skilled labor, and we are not afraid to compete with Americans on fair terms. If there were complete reciprocity in binder twine we could hold our own."

Think of it. In 1895 the Consumers' Cordage Company

operated ten factories in which employment was given to 1,800 Canadians, an average of 180 hands to each factory—to-day, all of them but one are closed and but 180 of this one-time army of 1,800 Canadians find employment. Where are the others? "To-day," says the manager, "1,200 ropemakers are out of employment, many of the best of them gone to the United States." What a commentary on "tariff reform." In a moment of fatal weakness, Mr. Foster reduced the duty one-half, and, following that lead, Mr. Fielding removed the other half, and the once flourishing industry collapsed.

The Globe's trusted agent and correspondent tells very plainly how and why the Canadian cordage industry suffered such disaster, and he also mentions the only thing that can resuscitate it—protection. But The Globe itself, true to its old instincts, accounts for it as follows:—

Barb wire and binding twine are among the first requisites of the struggling settler on the prairies, and it is considered of the first importance that he should not be condemned to pay a cent more for them than is absolutely necessary. In the early years on the western farm money is a scarce commodity, and to deliberately tax his first necessities for any purpose whatsoever is seriously objectionable. As to this both parties are agreed; indeed, the first step for the removal of duty on binder twine was taken by a Conservative Administration, although the propelling power was undoubtedly the Liberal Opposition.

Binding twine is no more a "first requisite" to the farmer than the mower and reaper, protected 20 per cent., or any other agricultural implement—the same duty on all—than the furniture in his humble home, protected 30 per cent.; than his wagon, protected 25 per cent.; than his wife's sewing machine, protected 30 per cent.; than the soap with which he cleanses himself, protected one cent per pound; than his cooking stove, protected 25 per cent.; than his knitted shirt, protected 35 per cent.; than his working tools, protected 30 per cent.; than his boots, protected 25 per cent.; or than the sugar for his coffee, protected one cent per pound. As The Globe's correspondent says, the farmer does not use as much binder twine in one year as he uses cotton or sugar in one week, calculating their value in dollars and cents; and as that correspondent truthfully says, the statement of The Globe is fallacious that the farmer is crying for the removal of the duty on binder twine, and that the removal of that duty has resulted in cheapening the price.

#### ENCOURAGING INFANT INDUSTRIES.

The American Miller has the following to say regarding the efforts being made by the Government of New Brunswick to encourage the wheat growing and flour milling industries of that province:—

"The people of New Brunswick, through their properly constituted Government authorities, are trying a somewhat doubtful experiment; we say doubtful, because we observe that the comments in New Brunswick papers in reference to it are apparently colored by political bias. We refer to the bonusing of flour mills and the encouragement of wheat raising, both of which have been undertaken by the Government, and both of which are apparently opposed by the newspapers of the party out of power. Accordingly, we think that the success or failure of the experiment will not be settled as judicially, on its merits solely, as it ought to be, but will be magnified or minimized according to party feeling.

"The claim is made, and apparently well founded, as stated previously in these columns, that New Brunswick's soil is capable of raising good crops of excellent wheat. Flour made from this wheat in a New Brunswick roller mill was tested the past month and was said to surpass both Ontario and Manitoba patents. Already nine sites have been approved for roller mills, the bonuses to be paid when the mills are completed. The present year between three and four thousand bushels of seed wheat have been furnished farmers, and the experiment of fostering a milling industry by Government aid and patronage is in full swing. We shall watch the progress of it with interest and only regret that politics may prevent one at a distance from properly noting its success or failure. A bonus is not always a bad thing, but one is tempted to believe that it is not often necessary when a real opening offers. Nevertheless we suspend judgment in this New Brunswick case. It seems certain that the province is capable of producing wheat of high character; but will it pay to raise it and mill it?"

The Methodist Magazine and Review for December closes its forty-eighth volume with a vigorous number. Among the admirably illustrated articles are, "Corea and her Neighbors," by the Rev. J. C. Seymour; "Snapshots from Jamaica," and "Among the Gypsies." "The Temper of a Saint; or, the Wit and Humour of John Wesley," by Rev. W. H. Adams; "George Fox and the Quakers," by Prof. Paisley; "Is the World Growing Worse?" by Dr. Dewart; "Some Curious Behaviours of Atoms," by Bishop Warren, and "An Indian Martin Luther," by Rev. Arthur Browning, are all strongly written and interesting articles. The departments of the World's Progress, Current Thought, Popular Science, Book Reviews, Religious Intelligence, are well maintained. Toronto: William Briggs. \$2.00 a year.

Outing for December is up to the usual high standard of this justly popular magazine of gentlemanly sport and pastime. Notable features include: "A New Brunswick Moose," "The Yarn of the Tampa," "The Collie and the Sheep Dog," "From the Schuylkill to the Potomac Awheel," "With Quail Among the Cotton," and "Golf and the American Girl." The history of the New York Athletic Club is pleasantly told, and the fiction department contains a complete story. Other contributions from far and near cover the sporting grounds of the world and afford the needful variety.

There has sprung up in the last decade a new art, one whose influence is making itself felt in our domestic lives to a greater degree day by day, the art of writing advertisements. The time has passed when a manufacturer or merchant could, by a bald announcement, attract the attention of consumers to his speciality, and the stress of competition has obliged them to engage the services of persons qualified by their peculiar talents to describe, in an attractive manner, the wares to be sold. One of the best advertising writers in Canada is Miss Nora Laughler, who has recently opened an office at 9½ Adelaide Street East, Toronto, and this assertion is borne out by a perusal of the list of her clients, which includes many of the largest and best-known commercial and manufacturing firms in Canada. Gifted with a facile pen, an artistic temperament and a nice power of discrimination, together with a thorough journalistic training, it is no wonder that Miss Laughler's position in her chosen profession is now assured. After writing the Cleveland Bicycle Ads. for two years, she received a testimonial from Messrs. H. A. Lozier & Co., which states: "As a general advertisement writer, we think you have no superior, and hope that you will meet with the success you so much deserve." Mr. C. E. Lozier, writing from the head office at Cleveland, Ohio, says: "Miss Laughler certainly shows more than ordinary skill and talent in ad. writing."—Toronto World.

The Secretary of the Canadian Manufacturers' Association is in receipt of a letter from Mr. Theodore C. Search, of Philadelphia, president of the National Association of Manufacturers of the United States, in which he says "we are watching with much interest the very active work which the Canadian Manufacturers' Association is carrying on in behalf of its members."

# CANADIAN MANUFACTURERS' ASSOCIATION.

President:  
**J. F. ELLIS.**

First Vice-President:  
**JAMES KENDREY, M.P.**

Second Vice-President:  
**P. W. ELLIS.**

Treasurer:  
**GEORGE BOOTH.**

Chairman Executive Committee:  
**R. W. ELLIOT.**

Chairman Tariff Committee:  
**W. K. McNAUGHT.**

*The Executive Committee meet on the Second Tuesday of each month.*

OFFICES  
**McKinnon Building,**  
TORONTO.  
Tel. 1274.

**J. J. CASSIDEY, - SECRETARY.**

**THE OBJECTS OF THIS ASSOCIATION ARE:**

To secure by all legitimate means the aid of both Public Opinion and Governmental Policy in favor of the development of home industry and the promotion of Canadian manufacturing enterprises.

To enable those in all branches of manufacturing enterprises to act in concert, as a united body, whenever action in behalf of any particular industry, or of the whole body, is necessary.

To maintain Canada for Canadians.

Any person directly interested in any Canadian manufacturing industry is eligible for membership.

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President, . . . . . **JAR. KENDRY, M.P.**

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**R. W. ELLIOT.** **GEORGE BOOTH.**  
**W. K. McNAUGHT.** **A. E. KEMP.**  
**J. J. CASSIDEY.**

**CANADA'S COMMERCIAL AGENTS.**

Following is the correct official list of Canada's Commercial Agents in Great Britain, British Possessions and Foreign countries.

- J. S. Larke,** Sydney, N.S.W., agent for Australasia.
- G. Eustace Burke,** Kingston, Jamaica, agent for Jamaica.
- Robert Bryson,** St. John, Antigua, agent for Antigua, Montserrat and Dominica.
- S. L. Horsford,** St. Kitts, agent for St. Kitts, Nevis and Virgin Islands.
- Edgar Tripp,** Port of Spain, Trinidad, agent for Trinidad and Tobago.
- C. E. Sontum,** Christiania, Norway, agent for Sweden and Denmark
- D. M. Rennie,** Buenos Ayres, Argentine Republic, agent for Argentine Republic and Uruguay.

In addition to their other duties, the undermentioned will answer inquiries relative to trade matters, and their services are available in furthering the interests of Canadian traders.

- J. G. Colmer,** 17 Victoria Street, London, S.W., England.
- Thomas Moffat,** 16 Church Street; Cape Town, South Africa.
- G. H. Mitchell,** 15 Water Street, Liverpool, England.
- H. M. Murray,** 10 St. Enoch Square, Glasgow, Scotland.
- Harrison Watson,** Curator Imperial Institute, London, England.

**A NEW HOME MARKET.**

While the Pacific Ocean of Canada extends from the Atlantic to the Pacific Ocean, its manufacturing industries have been thus far developed chiefly in the Eastern part of the St. Lawrence basin, and there are weighty reasons for believing that such will continue to be the case for many years to come. The fishery and mining interests are largely in the ascendant on both the Atlantic and Pacific Coasts, but Central Canada, not having these resources so distinctly at its command, must of necessity rely upon its manufacturing and agricultural products to supply its exchanges in home and foreign markets.

These conditions emphasize the fact that there is a new home market to be supplied to the best advantage by the manufacturers of Central Canada. In shipping to this market by the routes herein suggested, the disadvantages of long railway haulage and heavy cost of transportation to meet foreign competition, which can use cheaper ocean lines to reach the zone of the most active demand for manufactured goods in our new mining regions in the far North-west and in the territory west of the Rocky Mountains, not only disappear, but the situation is quite reversed, and our American competitors, to reach those regions, will find themselves on the long lines, with Central Canada on the shorter as well as cheaper routes.

We refer to the water-ways by which access may be had to the vast mineral regions of the eastern slope of the Rocky Mountains situated in the Mackenzie River basin, which are certain to come into great prominence with a rapidity not dreamed of except by those who have given careful study to the subject, viewed in the light of the most recent information.

**LIARD RIVER OR CASSIAR MINING DISTRICT.**

It is the opinion of experts who have explored the country, that the territory contiguous to the Liard River is bound to be a centre of great mining development in the Mackenzie River basin that will astonish all who may find their way thither from this time on. The first great discoveries of gold in this region of Canada were made as far back as 1872. In a lecture

recently delivered in Toronto by Mr. J. W. Tyrrell, formerly of the Dominion Geological Survey Corps, he exhibited a large map upon which was indicated the gold regions of Canada, and in referring to those of the Liard he said:

"You will see that the Liard River is situated about midway in the gold district of Canada, being about 750 miles from the northern boundary and 850 miles from the southern one, measuring from the mouth of its Nelson branch. At the head waters of this river you will notice an area marked Cassiar District. Gold was discovered in a small creek emptying into Dease Lake in 1872 by a Scotchman named McCullough and a Frenchman named Thibert, who went as partners to fish in the lake, in which, as well as in the beds of some small streams, washings were obtained as high as \$100 a day. At the mouth of one of these creeks from six to eight men took out 300 ounces of gold in one week; and the year's output of 1874 is stated at \$1,000,000. The population about the lake in 1876 was estimated at 2,000, but the annual average yield thereafter decreased to such an extent that nearly all the miners left for other localities and but a small number remain there now.

"The total output of gold up to 1887 is reported by Dr. Dawson to have been \$4,886,000 in the Cassiar District alone.

"Gold is also found in the Dease and Liard River bottoms, and it is stated that from \$6 to \$8 per day can yet be made by hand-washing along their sandbars. Taking into account the length of small auxiliary creeks and rivers, it seems certain that there must be hundreds of miles of such water courses where many miners can find employment, in the main valley of the Liard and its tributaries.

"The reason why mining has languished since 1876 was largely because of excessive cost of transportation, the rate being nine and a-half cents per pound, or \$195 per ton from Fort Wrangel, but lower down the river the situation was much worse, where miners were more isolated than at the Klondike."

Reference to Dr. Dawson's report discloses the fact that on his way down the Liard River, a miner's shack was pointed out to him where all the inmates had died of scurvy



owing to the difficulty of procuring provisions in that then remote region utterly lacking transportation facilities.

Those unfavorable conditions are now improved because of the access that may be had to that river via the Athabasca, Peace, Slave and Mackenzie Rivers, and also by overland trail from Edmonton, in addition to those first used, passing through the Rocky Mountains from the Pacific Coast.

The abandoned gold districts of the Liard are again beginning to swarm with prospectors, and reports are coming from them which will increase the numbers of gold hunters many fold during the next summer.

#### THE PEACE RIVER OR OMEICA MINING DISTRICT.

The Omeica District in the upper waters of Peace River is also making rapid development as a hydraulic mining district.

Referring to this district The Edmonton Bulletin of Nov. 7th makes mention of the return of Mr. Deachman, who had gone overland to the Omeica branch of the Peace River and had found numerous companies at work there on immense gravel beds that were yielding "pay gold." Mr. Deachman had come out to purchase mining machinery, he having located several mining claims there. In the November 10th issue of the same paper, mention is made of the arrival at Edmonton of explorers from the Liard River who had seen a party of six men working on some of its bars, each of whom were recovering from \$25 to \$50 worth of gold per day. These explorers reported that about 1,800 horses had been used to take in supplies, and which were being wintered in the region, to be again thus employed the coming season on the overland route.

Such facts imply a magnificent opening to our manufacturers for selling machinery and supplies of all kinds, but that it can be secured to them against all competitors is not yet fully realized. Nevertheless such is the fact, and what is even more surprising is that energetic measures can, within a short time, capture it by the construction of less than 200 miles of wagon road made across the divides between navigable waters of the St. Lawrence and Hudson Bay basin, and between the latter and the Mackenzie River basin. These roads, together with suitable steamer connections, which could be provided in a few months, would enable Canadian manufacturers to deliver their products into the Liard District at one-half the cost of similar delivery from the Pacific Coast, and thus enjoy a trade the development of which would quickly secure substituted and improved railway transit with business enough to keep their present manufacturing facilities in full blast.

#### THE NATURAL COMMERCIAL ROUTE VIA HUDSON BAY.

An inspection of a map of Canada shows that between the St. Lawrence and Mackenzie River basins lies that of Hudson Bay, which is larger than either of the others and forms a natural connecting link between the two, but which has never been appreciably utilized for such commercial purposes. The nearest approach of the open sea waters of the Hudson Bay basin to that in the more southerly zone is on a line drawn from the mouth of the Michipicoten River on Lake Superior to the mouth of the Moose River on James Bay, an air distance of not quite 300 miles; and the nearest approach to that on the north-westerly side is on a line drawn between the western end of Chesterfield Inlet, otherwise known as Baker Lake, and the eastern extremity of Lake Clinton Golden, which connects with Great Slave Lake, a distance of about 250 miles. Nature has not only caused the navigable waters of those vast basins to approach nearest together at those points, but has also created valleys between them which afford the most favorable possible routes for railway connection. The overland portions of these divides are really less than half of the distances indicated.

#### SOUTHERN "DIVIDE" FEATURES.

Thus the Canadian Pacific Railway line passes over 50 miles to the north of Lake Superior, while the navigable waters of Moose River, on which steamers could be used,

reach southward from the Great Canadian Sea to within 114 miles of the railway line, so that if that distance were opened to the extent of ordinary wagon road facilities, commerce could be carried on between the two basins through the centre of the Province of Ontario, where there is now not even a blazed trail for winter transit, and a circuitous canoe summer route is only used.

In 1897, the Ontario Government sent W. A. Charlton, Esq., M.P.P., as a commissioner to report on the character of the divide between the Canadian Pacific Railway and Moose River, and published his report on that subject, from which much of the information contained in these pages is obtained.

#### NORTH-WESTERN SUMMIT.

At the North-western divide the Telzoa River comes into Chesterfield Inlet from the west, and is known to be navigable for steamers to the Forks where the main stream turns south after reducing the divide distance to about 120 miles. But at the Forks a large branch continues westward towards Lake Clinton Golden, which is a deep navigable stream, but which has not yet been explored by reliable surveyors. From information obtained from Indians who have crossed the divide, it is practically ascertained, however, that the river approaches within probably less than 40 miles of the lake, and the intervening land is a stretch of level country where they experienced no difficulty in carrying their canoes.

The Messrs. Tyrrell crossed from Lake Athabasca to the head waters of the south branch of the Telzoa River, which they descended to its confluence or Forks with the west branch, extending towards Great Slave Lake. They passed down the River and found it navigable for river steamers all the way to Chesterfield Inlet, which they traversed to Hudson Bay, continued down the coast to Fort Churchill, going thence overland to Winnipeg. From these and other reliable sources of information the following table of distances is compiled:—

#### FROM TORONTO TO GREAT SLAVE LAKE.

VIA MOOSE RIVER ROUTE.		MILES.
Toronto to North Bay by G. T. Railway.....		229
North Bay to Missanabie by C. P. Railway.....		311
Missanabie to Mooso River, Str. Ludg, wagon road (Air Line).....		114
Via Moose River, Str. to tide water in Ontario.....		122
Ontario to Telzoa River, deep sea navigation.....		1,310
Telzoa River to Tyrrell Forks (steamer navigation).....		130
From Forks to Lake Clinton Golden, part river and part road unsurveyed, estimated water way, 120 miles, and road, 40 miles.....		160
Lake C. G. to Great Slave Lake, Lake and River, 90 miles; Rapids, 20 miles.....		110
By R'y, 540; Road, 154; River str., 462; Rapids, 20; Sea Str., 1,310; total.....		2,486

VIA EDMONTON ROUTE.		MILES.
Toronto to North Bay by G. T. Railway.....		229
North Bay to Edmonton by C. P. Railway.....		2,227
Edmonton to Arthabasca Landing by wagon (usual distance travelled).....		110
Arthabasca Landing to Grand Rapids by river steamer.....		167
River Rapids by batteaux to Fort McMurray, including portages.....		67
Fort McMurray to Slave River Rapids Steamer Landing.....		287
Landing above Rapids to Fort Smith—wagon road or tramway.....		16
Fort Smith to Slave Lake via Slave River by steamer.....		212
By R'y., 2,456; by Road, 126; Rapids, 87; River Str., 666; total.....		3,335

Difference in distance, 849 miles. In transit cost, over 50 per cent. in favor of Moose River route. Also 10 per cent. shorter time as soon as wagon roads across the divides are available, and 50 per cent. less when railway and steamer connections are perfected.

## DEEP WATER WAYS TO THE GOLD FIELDS.

From the eastern end of Great Slave Lake to the Mackenzie River there is 300 miles of deep waterway; thence to the mouth of Liard River, 200 miles of unobstructed river channel, and the same up the Liard River, 350 miles to Fort Halket. Here this rapids total  $7\frac{1}{2}$  miles, beyond which to end of Dease Lake, and through gold deposits on rivers bars all the way for 250 miles, there is unobstructed steamer navigation, or a total of 1,100 miles.

From like starting point to the Omenica gold deposits in the Peace River basin is an unobstructed water-way of 1,475 miles, excepting 16 miles of tram roadway at Fort Smith and 12 miles of rapids near the Rocky Mountains.

It needs no argument to prove that, under such conditions, these regions can be supplied with manufacturers and merchandise from the St. Lawrence basin cheaper than from any other source.

Both of these gold districts bid fair to outrival the Klondike in the near future because of more favorable climatic conditions and the important fact that ledge as well as placer mining is already established there. Silver and other minerals are also present in promising but as yet undeveloped quantities.

## MORE EASTERLY MINING DISTRICTS.

But the case is not yet fully stated:

The basin of Great Slave Lake, it has just been discovered, is also a mineral district, and may very quickly become the centre of a "mining boom."

The following items are signs indicating the trend of coming events. The Edmonton, N.W.T., Bulletin, of September 2, 1898, says:

"A letter received on Monday by McDougall & Secord from E. Nagle, of Fort Resolution, is dated from Chippewyan on August 16th, Mr. Nagle says, 'There are quite a number of parties who have made up their minds to winter here (Fort Resolution). We may have a big mining camp here next year, as people are finding gold and silver bearing quartz on every island. The miners are not troubling the Indians as much as I expected.'"

The same paper on August 19, 1898, says:

"A party of prospectors, Andrew Rogers, A. L. Dantrey, Geo. A. Standigel and August Collin, comprising the St. Mary party, from Chicago, returned from Great Slave Lake on Saturday. They left the lake on July 6th. They bring with them three sacks of silver ore amounting to about 150 pounds in all. This ore which appears to be more than usually rich, they state was broken off by them from a ledge on the shore of Great Slave Lake, just where, they do not say. Six claims were staked, a man was engaged to look after the place, and leaving their outfit, the party returned to register their claims and have their ore assayed. Samples have been given to John A. McDougall, who is having them forwarded to Ottawa. The party are in camp back of McDougall & Secord's store waiting the result of the assay."

Since then intelligence has been received from Ottawa to the effect that samples of silver ore from Great Slave Lake had been assayed there and found to yield a very satisfactory percentage of the precious metal.

## PRACTICAL SUGGESTIONS.

## I.

The previous paragraphs have shown a new market for our home manufactures and the most practicable route to reach and control the same, which certainly warrant a careful investigation to ascertain the best means for securing both in rapid combination.

In such enquiry the following axioms can be safely adopted:

(1) That true economy in the case relates more to time, than to expense. In other words: That plan which will establish the proposed transit at the earliest date, even at a considerable percentage of extra cost, is by far the most economical, because channels of trade are now to be opened

which will widen and deepen themselves, when once the current of traffic commences to flow through them, like pent-up waters through restraining earth embankments. Whether the current of trade is to set towards the St. Lawrence or the Pacific, from these new mining districts, depends largely upon which way the first mails and express are carried and telegraph lines established—adequate passenger and freight facilities will follow in due course. The "pony express" mail route across the great unexplored regions west of the Mississippi, hastened the building of the United States railway lines to California by a score of years, and the liberal subsidies made to it by the United States was one of the best expenditures that Government ever made to promote internal development. Although temporary in its nature it opened a commercial transit channel which has now caused the Pacific coast lines via Panama and Tehuantepec to dwindle into insignificance. Similar results will follow opening the new route from the St. Lawrence to the Mackenzie Basin, first by wagon roads, to be followed by the railway, when the commercial currents are turned this way. Therefore that route which can offer to open up wagon transit, and carry the mails and attract explorers earliest and cheapest is the one to be favored first, provided railway transit is also secured, to meet commercial developments later on.

The Province of Ontario is the only one having a Great Lake and a Great Sea Coast. It may be safely asserted that on the average of ten years from 1897 inclusive, when the mineral wealth of the north-western section of this continent first aroused world-wide attention, it will lose five hundred thousand dollars of national wealth annually during the time when the route indicated in preceding paragraphs remains unopened. By the 1st of January next its loss will equal more than one million dollars, on the average of the present decade.

It has expended possibly one thousand dollars in causing a reconnaissance of the Moose River route to be made in 1897, but not a dollar in that direction in 1898 so far as published reports show.

If the journals of the Legislative Assembly of 1898 be inspected it will be found that days, if not weeks, were expended in discussions about a "piggery" near Toronto, and not an hour concerning opening a commercial avenue to the Great Sea which laves the northern boundary of the Province. Had either political party made that an issue and called the voters attention to it with the array of facts which could have been given to show that it was the most important provincial interest to be immediately dealt with, who can doubt that the result would have been overwhelmingly in favor of progress in that direction?

As matters now stand the first to move for a new departure in this regard should be the manufacturers of the St. Lawrence Basin. They should overture both the Provincial and Dominion Governments to set forces in motion to have a wagon-road and telegraph line extended from the C.P.R. to the navigable waters of the Hudson Basin in 1899, without fail, and likewise across the divide between the Hudson and the Mackenzie Basins and provide for mails to go that way as soon as possible. This is the best policy for hastening the advent of early railway facilities across the "divides" and Government should be liberal in subsidies to these preliminary stages as based upon the soundest principles of statesmanship.

2. That the Government of Ontario should take the lead, and the Dominion should join on the basis of offering a prize for the most rapid accomplishment of specified results in opening the route, and exercise governmental functions in inspecting, but not in managing the work to be done.

The first mentioned policy insures success as to both time and cost, the other implies delay and the wasting of public moneys by inefficiency in everything but "political pulls."

In a supplementary paragraph some figures may be given to show the force of this axiom, but at present it will be simply remarked that if the cash subsidies voted by the Province in the last few years to railways not as yet commenced, and by the Dominion for exploration and surveys of

transit routes not materially benefitted thereby, had been offered as a bonus for opening roadways and telegraph lines between our great interior basins on the best commercial lines, every manufacturer, to say nothing of all other interests in the St. Lawrence Basin, would have been sensibly benefitted by this time, in the new business brought to our midst.

The last axiom to be stated for the present is:—

(3) That in a matter of such importance to our manufacturers as the new market and transit facilities herein before referred to, they should unite to select the best plan of procedure. Other organizations, such as, Boards of Trade, etc., should be invited to cooperate with them in urging prompt governmental action as pivotal to the success so worthy of such special efforts to attain.

In brief: The three leading elements of success in this case are:—

First:—The less time the greater reward.

Second:—Special Governmental aid for accelerated results.

Third:—Educated Commercial Effort, to secure best commercial benefits from enlarged markets under present new conditions.

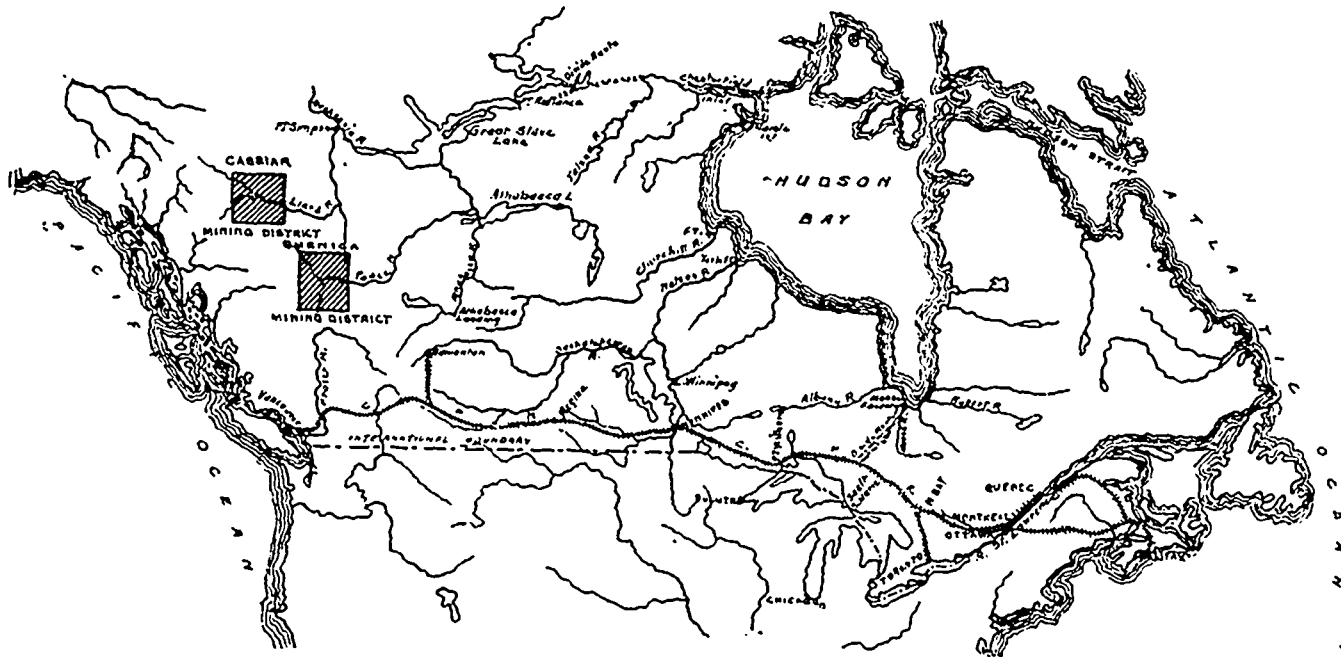
The accompanying diagram shows two gold mining districts capable of rivaling the Klondyke in productiveness, the

in Ontario and Quebec. The loss from the want of these facilities, from this source alone, was therefore over \$490,000, of which Chicago gained the bulk, or possibly more than that amount, including canned goods and other provisions.

(2) But that loss is destined to be exceeded by another during the present decade, namely, that every year which defers railway access to the Northern Sea involves a waste of fishery resources of from one half to one million of dollars per annum, the cash for which would mainly accrue to Ontario and Quebec.

(3) Another gain, especially to Ontario, would be in opening up the vast wilderness known as "New Ontario" in the Hudsons Bay basin.

At present not a town, village or farm exists there, nor even a settlement, except as an adjunct to the fur trading posts of the Hudson Bay Company, from which source every influence is exerted to prevent other developments of the industrial resources of that region of nearly 100,000 square miles, or allowing it to become known or utilized; the same policy extending also to the unlimited marine wealth beyond, and this policy has been carried out with marvellous effectiveness thus far. That settlements will follow the advent of roads and railways into that Basin cannot be doubted and the



trade of which can be controlled by our home manufacturers if foregoing suggestions are promptly made effective.

#### IN REVIEW.

In preceding paragraphs the average annual loss of business to the manufacturers and merchants of Canada from the non-opening of the Hudson Bay route to the Mackenzie Basin was estimated at \$500,000 a year during the present decade commencing January 1, 1897.

This estimate is based upon the following premises:

(1) At one time in the month of April, 1898, there were 900 stalwart pioneers camped at Arthabasca Landing seeking passage through the waterways of the Mackenzie Basin, including some who intended to cross over the divides into the Yukon regions. These were not more than one-half of the number passing that way during the season. Their average outfit and transit expenses were more than \$400 each. Had the Ontario route been available with wagon or "tote" roads, and connecting steamers, all of these frontiersmen starting from Europe, the United States, or Canada east of the 94th meridian, comprising at least two-thirds of the entire number, could have reached their destination easier, quicker, and cheaper via the new route, and would have adopted it. Their outfit, outfit and expenses would have been disbursed

additions to the national wealth from that source will be as remarkable as gratifying.

It is submitted in view of these considerations that an argument in favor of estimating the annual loss to the commonwealth at a million of dollars instead of one-half that amount will not be deemed untenable.

#### PER CONTRA.

It may be assumed that no one will advocate having the new route exploited under governmental control, with entailment upon it of the ultimate risk of financial loss from bad business management. The opening of wagon roads across the divide are of value only as preparatory to railway routes, neither of which would be of much importance except when combined with steamer connections between the long intervening marine and inland waterway spaces.

While avoiding the financial morass of direct responsibility Government can pre-eminently afford in this case to be liberal with collateral aid, especially so far as it can be repaid from the new districts opened up and thereby rendered commercially valuable. Thus, while the Province of Ontario is nearly the sole land owner along the route within its limits, an allotment of a part of the area to be benefitted, to aid the transit improvements can be advocated upon the highest

principles of wise statesmanship, because, what the Province retains will evidently be worth far more as a public asset than the whole in its present unimproved condition.

There has been on the Dominion Statue Book for many years (since 1886) authority to confer a land grant upon any railway first built from the line of the Canadian Pacific Railway to Hudsons Bay. It was evidently in view of a route then agitated to go through Manitoba and the adjoining territory where the Dominion controlled the Crown lands. Then the value of the divide system herein set forth was not known, any more than was the wealth of the Klondike. Under present conditions the route through Ontario will be worth far more to the Dominion than one through Manitoba can ever be, and the cost less by scores of millions. Let the Dominion now make its non-used offer clearly applicable to the new route with the quota of lands to be selected in districts commercially benefitted by the same, and it will improve upon the original intent and add a most favorable page to Canadian History.

The idea was broached some time since that the unutilized fishery resources of those northern waters could be made to contribute towards furnishing access thereto. The details are not at hand, but the plan is a most admirable one and can unquestionably be formulated into workable shape with such manifest public advantage as to secure general and immediate approval.

#### INVESTMENT FEATURES.

Those promoters, whether they be Mayors of cities or less prominently before the public, who speak lightly of the difficulties of securing the building of a pioneer railway line to the great north sea stamp themselves as being of those who expect that the funds are to come from air-castle investors—certainly not from the advocates' pockets.

If it be possible that funds are forthcoming to build a line on the proposed route as quickly as money can do it, hasty surveys and mislocations may result in subtracting a large percentage of the ultimate value of the work. Cases can be cited where millions have been sunk in mistakes of this nature.

Then when the railway is rushed through where is the immediate traffic for it? There will not be an acre of cultivated ground along the entire route, or an Anglo-Saxon settler in independent circumstances from one end to the other. At the sea coast, terminal facilities must be provided before large traffic in persons or property can be accommodated. The most favorable estimates place the harbor improvements necessary to admit ocean steamers of large class at three millions of dollars, the construction of which would require several years, even if the money was ready. The fishery industry must be organized and time allowed for its becoming reliably productive. Meantime the interest account of the completed railway will be running against it whether it does business at all or not. The most reliable estimates from experienced builders of railways in that region place the cost of

a line of the standard of the Canadian Pacific Railway for construction and equipment at \$30,000 per mile, or say, \$7,500,000 for the shortest line, exclusive of terminals. The interest and depreciation on this investment would equal 10 per cent. per annum, or 50 per cent. in the first five years, which period will be certainly required to organize a traffic sufficient to pay a moderate percentage on original cost.

These are cold facts which will not down, and yet in the face of them application was made to the last Dominion Parliament for the charter of a railway from Toronto to Fort Churchill—a distance of over 1,300 miles, and it was gravely stated that the city of Toronto might pledge its credit to build the line in order to have a geographically straight route of which it would become the southern terminus, and that in the meantime all loyal citizens should wait the report of a Commission appointed by the Mayor to investigate the subject, for whose expenses \$5,000 was actually placed in the municipal estimates.

There are those who point to this as being obstructive tactics prompted by sinister influences. Be that as it may, the actual facts are as stated, and are submitted without note or comment—except to remark that when such plan succeeds, men will be found splitting logs by driving in the butt end of wedges.

#### THE PATHWAY TO SUCCESS.

The gist of this review of the question is to advocate precisely the reverse mode of treatment, namely, to choose the lines of least resistance. The thin edge of the transit wedge driven first is the correct solution of the present difficulty, or in other words, introduce a survey with a telegraph line first, next a wagon road and mail route, then economical river and coast line steamers for divide connections, which can inaugurate profitable through business, from the growth of which railway service and ocean steamer facilities can be wisely evolved, profitably sustained, and usual pioneer failures and "reorganizations" successfully avoided.

In connection with explorations of routes to the new mining regions, the following telegram was sent out from Vancouver, B.C., on Nov. 24th:

Inspector Moodie, the most-talked-of member of the Northwest Mounted Police that ever started out for the Klondike, arrived in the city to-day. He reached Victoria on the steamer Dirigo last night, and came over to Vancouver on the steamer Islander this morning.

A year ago last September Inspector Moodie was sent out by the Dominion Government to find a route from Edmonton to Pelly banks.

For men going right through to the Yukon country, Inspector Moodie says the Edmonton route is not to be compared to the coast route, but it would open up a country which is richer even than the Yukon valley. Every creek in Northern British Columbia contains gold, and although the inspector makes no pretensions of being a mining expert, he saw enough

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NEW YORK OFFICE—805 St. James Building.  
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to convince him that the country is rich beyond compare, and mining men whom he met en route told him that the prospects for quartz mining were excellent.

Attention is particularly directed to the fact that the districts the inspector refers to are those marked Omenica and Cassiar shown in the map on page 13 and which can be reached during the season of navigation the cheapest and quickest from Ontario by the new route herein advocated. The Inspector's report is proof of the importance of the region in view.

The Edmonton Bulletin of November 14th, has a long list of names of miners who are working on the Omenica creeks, obtained from one of their number coming out for supplies, and who was to return at once. The average yield of the placer mining was stated by this miner as being \$108 per cubic yard.

Another item in the same issue of that paper gave the name of the party who had taken a contract to transport 80 tons of goods from Edmonton to Lesser Slave Lake at \$60 per ton, provided the same could be hauled over snow roads. Navigation was then open on the rivers. With the new route available, Ontario could have sent those goods at a less freight cost from its own shores.

Whether explorations like those of Inspector Moodie's trip give value for the public moneys expended on them is an open question. We find in the Dominion supplementary estimates for 1898, \$15,000 for opening a trail from Edmonton towards the Yukon district. For exploratory survey from an existing railway into the Klondike district, \$40,000. Ditto between Stikine River and an ocean port in British Columbia, \$35,000. Extra expenses of the two parties in Yukon district, \$5,000. Also for exploration survey to same district for railway purposes, \$5,000. Steamboat and steam launches for Government use on Yukon River, \$25,000. These figure up to \$125,000 for

this year alone. How much of this expenditure will show tangible results, we are at present unable to state. We hope it will "pan out" better than the like sum heretofore devoted in past years for expeditions to ascertain economic conditions in Hudsons Bay and Straits.

The climatic conditions of the regions to be traversed by the new route are more favorable than generally supposed.

The Moose River is navigable for the same period as the St. Mary's River through which the commerce of Lake Superior passes.

Hudsons Bay is navigable like the Ocean the entire year.

The isothermal lines in the Mackenzie Basin run nearly north-westerly and south-easterly, and the seasons of the Great Slave Lake region are similar to those on the southern borders of Lake Superior, or the latitude of St. Paul, Min.

The Liard River becomes free from ice in April and the Mackenzie early in May.

The climate of the Peace River Valley is milder than that of Southern Ontario.

The favorable bearing of these facts upon the question of the successful utilization of the unrivalled waterways herein mentioned as available for commercial connections with Central Canada will appear at a glance.

Mr. T. M. Rennie, Canadian Commercial Agent in the Argentine Republic, reports to the Department of Trade and Commerce that the Government of the Argentine Republic has, in addition to the inland revenue tax, imposed Customs duties doubling the rates on all the goods paying 2½ to 3 per cent. ad. valorem, and adding 10 per cent. on all duties over these rates. The rate on spruce, white and pitch will now be \$8.44 per 1,000 feet instead of \$3.08. The proceeds of these taxes are to be used in payment of mobilization armament.

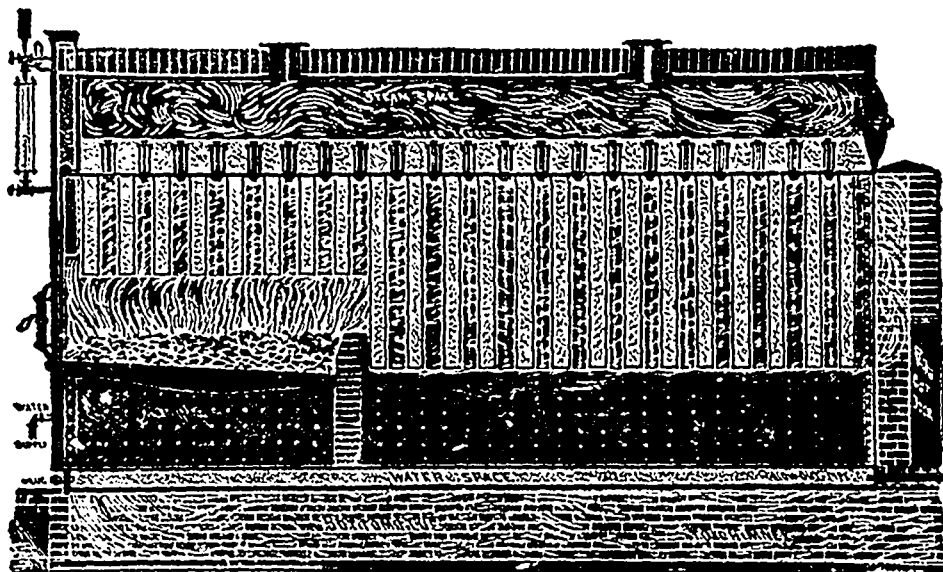
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*For Steam, Power  
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Installations...*

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Can be installed in any Basement,  
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A Saving in Fuel of 50 per cent. over any Cast Iron Heater.

...Catalogue Free.

## CAPTAINS OF INDUSTRY.

The following items of information, which are classified under the title "Captains of Industry," relate to matters that are of special interest to every advertiser in these pages, and to every concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses also.

If a new manufacturing enterprise of any kind is being started, or an electric lighting plant instituted, or an electric railroad, or a telephone, or a telegraph line is being constructed; or a saw mill, a woolen, cotton, or knitting mill; or if any industrial establishment has been destroyed by fire with a probability of its being rebuilt, our friends should understand that possibly there may be something in the event for them. Do you catch on to the idea?

The starting of any such concern means a demand for some sort of machines, machinery, or supplies, such as steam engines and boilers, shafting, pulleys, belt- ing, lubricants, machinery supplies, wood or iron working machinery, ventilating and drying apparatus; pumps, valves, packing, dynamos, motors, wire, arc and incandescent lamps, and an infinite variety of electrical supplies, chemicals, acids, alkalies, etc. It is well worth the while of every reader of the Canadian Manufacturer to closely inspect all items under the head of Captains of Industry.

Sewrey's foundry, at Barrie, Ont., which has been idle for nearly three years, and has a capacity and machinery for the employment of some eighty workmen, has passed into the possession of Messrs. Dymont & Butterfield, that town, who have had the machinery put in thorough order preparatory to resuming work. They will manufacture boilers, engines, mill machinery, ploughs and other farm implements. In a few days they will have twenty men at work, and will expand the business until the foundry is running to its fullest capacity.

The green glass furnaces and buildings containing them, of the Diamond Glass Co., at Montreal, were destroyed by fire Dec. 9th, loss about \$1,500. The damage will be repaired without delay.

The town of Thorold, Ont., is to have a new industry in the shape of works for the manufacture of caustic soda and bleaching powder. An American syndicate have purchased five acres of land at Thorold, and propose commencing the erection of the buildings for the new works at once. The caustic soda and bleaching powder are to be made from salt, which will be conveyed to the works from Goderich, and the output, it is expected, will be not less than one hundred tons per day.

If arrangements can be made, it is likely the Canada Hygiene Shoe Manufacturing Co. will locate in Kingston, Ont. The company has been organized in Montreal, with a capital stock of \$100,000.

The John E. Cassin Co., Spokane, Wash., are offering to send handsome cabinets of specimens of the gold, silver, copper and

lead ores obtained from British Columbian mines, with catalogue describing each specimen and the different mines from which they were obtained.

Application will be made to the Legislature of Ontario, for an act to legalize a by-law of the corporation of the city of Kingston, entitled, "A by-law to partly exempt from municipal taxation, the property of the Dominion Cotton Mills Company, Limited, for a period of twenty years, from the 30th day of June, 1901, upon certain conditions," under which by-law the property of the said company in Kingston, is exempted from taxation for the said period of twenty years.

Application will be made to the Legislature of Ontario for a special act to legalize and confirm a by-law of the town of Prescott, entitled a by-law "to raise the sum of one hundred thousand dollars for the construction of a system of waterworks and sewers in the town of Prescott."

P. Burns & Co. are erecting a cold storage warehouse at Nelson, B.C.

The Bertram Shipbuilding Co., Toronto, are contemplating the establishing of a shipyard at Vancouver, B.C.

The Sarnia Salt Co., Sarnia, Ont., has increased its capital stock from \$20,000 to \$100,000.

The Hamilton Stock Yards Co., Hamilton, Ont., has been incorporated with a capital stock of \$50,000, to carry on stock yards, cure meats, etc. Anderson Fowler, T. H. Lawry and J. J. Scott are provisional directors.

Application will be made to the Ontario Legislature for an act to legalize a by-law of the town of Dundas, Ont., granting a bonus of \$12,000 to Messrs. John Bortram & Sons, Dundas.

The Guelph Carpet Mills Co., Guelph, Ont., has been incorporated with a capital stock of \$40,000, to manufacture carpet furniture covering, curtains, etc. Messrs. Robert Dodds, R. E. McPherson, George McPherson and Christian Klooper are the provisional directors.

The J. R. Stouffer Mfg. Co., Berlin, Ont., has been incorporated with a capital stock of \$40,000, to manufacture buttons, suspenders, etc. Messrs. J. R. Stouffer, Josiah Betzner and M. F. Auther are the provisional directors.

The J. C. Scott Co., with head office at Toronto, has been incorporated with a capital stock of \$60,000, to carry on a planing and sawmill business, etc. Messrs. J. C. Scott, F. J. Russell and O. F. Rice are provisional directors.

The Merchant Tailors Mfg. Co., Toronto, has been incorporated with a capital stock of \$10,000, to manufacture clothing, etc. Messrs. J. R. Marshall, A. M. Hobberlin and J. E. Austen are provisional directors.

The Northey Mfg. Co., Toronto, in their advertisement in page 8 of this journal, call attention to the new style gas and gasoline engines manufactured by them. They say that this engine produces power cheaper than other engines, and that it is replacing even water power. It is made in sizes from 2 to 200 h.p. The company supply it where small power is required, geared to electric plants, and adapt it for factory and house lighting, etc.

At St. Thomas, Ont., a by-law will be voted on at the forthcoming municipal elections in January to raise \$33,000 to establish a 100-arc lighting plant to light that city.

The Packard Electric Co., St. Catharines, Ont., always do the right thing at the right time. This time they have sent us desk blotters with the inscription, "A Merry Christmas to All," and appropriate reference to the lamps, transformers, meters and other supplies manufactured by them. There are also beautiful cards upon which are illustrated with representations of some of their products. "O Carey us back."

The large elevator of the J. G. King Company, of Port Arthur, Ont., is being lighted throughout by electricity, the entire plant being furnished by the Royal Electric Company of Montreal.

## INGERSOLL-SERGEANT Rock Drills

FOR MINES, TUNNELS AND QUARRIES

## PISTON INLET Air Compressors

STRAIGHT LINE  
DUPLIX and  
COMPOUND.

FOR ALL DUTIES.

... COMPLETE MINE EQUIPMENT ...

JAMES COOPER MANUF'G CO., Limited, - 299 St. James St., Montreal.

Other Offices - - - ROSSLAND, B.C. RAT PORTAGE, ONT. HALIFAX, N.S.

The Nova Scotia Carringe Co. has ordered a 50 horse power engine and boiler from the Robb Engineering Co., for the new factory they are building at Kentville, N.S.

The Stevens Manufacturing Co., London, Ont., iron and brass manufacturers had their factory and plant destroyed by fire, November 26th. Loss, about \$8,000.

Grant's Music Hall, Ottawa, Ont., was damaged by fire, November 27th, to the extent of \$10,000.

The Robb Engineering Co., Amherst, N.S., have received an order from New York parties for two 300 horse power engines for an electric railway in Australia.

The Frontonac Milling Co., Kingston, Ont., will apply for incorporation with a capital stock of \$50,000, to manufacture flour, meal, etc.

Mr. H. S. Dowd, Almonte, Ont., will erect a large oatmeal mill at Quyon, Que. The Goldie & McCullough Co., Galt, Ont., will supply the machinery.

The Aptees Collapsible Box & Veneer Co., West River, Albart Co., N.B., have bought a 125 horse power boiler from the Robb Engineering Co., Ltd., Amherst, N.S.

The Goldie-McCullough Co., Galt, Ont., recently shipped two carloads of machinery, including a large Wheelock engine, elevator machinery, and shafting, to St. John, N. B., where it will be placed in the large C. P. R. elevator.

The Canadian Engine and Locomotive Works, Kingston, Ont., have under contract two engines for the Intercolonial Railway, six for the Canadian Pacific Railway, and five more have been ordered by Hon. Mr. Blair for the Government railways.

The abattoirs in the municipality of Delormier, north of Montreal, were destroyed by fire on November 20th. Loss about \$20,000.

The Northern Electric Mfg. Co., Montreal, has increased its capital stock to \$1,000,000.

The B. F. Sturtevant Co., of Boston, Mass., have just issued a second edition of their very suggestive pamphlet, Bulletin E., entitled "Draft Without a Chimney." We understand that it will be mailed on application.

In page 8 of this journal will be found the announcement of John Forman, 644 Craig street, Montreal, to the effect that he is well stocked up with calcium carbide, orders for which he can fill promptly. This should be good news to manufacturers of acetylene gas machines, and the users of them also, as much difficulty has been experienced in obtaining prompt deliveries of carbide. We are not aware of any other source from whence the article can be obtained on immediate notice in Canada.

Dick, Ridout & Co., have built a new mill at Cobourg, Ont. The building, which is of brick and is 180x65 feet and two stories in height, will be used for a bag factory.

The Ottawa Stock Yards & Abattoir Company, Ottawa, Ont., has been incorporated with a capital stock of \$50,000.

The Toronto Rubber Shoe Co., Toronto, has increased its capital stock from \$100,000 to \$250,000.

A. Burrows is building an addition to his carpet factory at Breslau, Ont.

J. B. Shantz, Berlin, Ont., will erect a branch of his button factory in La Salle, N. Y.

Benoit's sawmill at Weedon, Que., was destroyed by fire recently.

The lumber yard of Hector Ross, near Sherbrooke, Que., was destroyed by fire recently. Loss, about \$9,000.

A new incandescent electric lighting plant is to be installed at Campbellford, Ont., for which \$8,000 was recently voted by the rate-payers.

Reinhardt & Co., Toronto, have taken out a permit for a three-storey brick and stone addition to their brewery, to cost about \$5,000.

W. Somerville, Hamilton, Ont., has established a fruit evaporating plant in the old Stewart foundry building.

The Goldie-McCullough Co., Galt, Ont., recently made a shipment of sugar machinery to Trinidad, W. I.

The Berlin Brush Works, Berlin, Ont., are removing their plant from that place to Waterloo, Ont.

Constable's Printing Office, Brantford, Ont., was destroyed by fire, November 16th. Loss, about \$300.

A by-law to provide \$6,000 for the purchase of an electric light plant for the town of Acton, Ont., has received the sanction of the ratepayers. Arrangements will be made immediately for the installation of the plant.

The George R. Gordon Co., Vancouver, B.C., has been incorporated with a capital stock of \$100,000.

The Canadian Engine and Locomotive Works, Kingston, recently received a contract to build five ten-wheel passenger engines for the Intercolonial Railway.

## THE NEW PRINCIPLE IDEAL ACETYLENE GAS GENERATOR.

Acknowledged by Experts and Insurance Inspectors as the only perfect and safe system for Generating Acetylene Gas.

### ADVANTAGES

Of New Style . . .  
Carbide Submerging  
Machine . . . . .

No Generator to Open to Recharge.

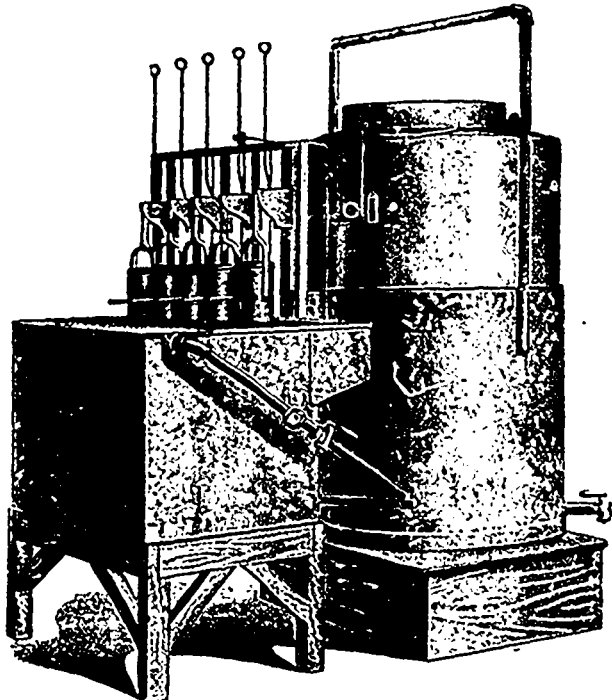
Gas is Generated under Water and is Cool and Pure.

200 Degrees less Heat in Generator than in Old Style.

Absolutely no Over-Generation or Loss of Gas.

Can tell at a Glance exactly how much Carbide is Used, and how much Unused.

Separate Ideal Generators supplied for attachment to present Gas Holders where Sprinkling Generators are now in use.



### DEFECTS

In Old Style . . . . .  
Sprinkling Machines.

Generator must be Opened to Recharge with Loss of Gas and Bad Odour.

Gas Generated by Sprinkling is Hot and Impure.

More or Less Over-Generation and Waste of Gas.

Cannot tell how much Carbide is or is not used without opening Generator.

**J. WALLACE & SON,**  
MANUFACTURERS OF Acetylene Gas Apparatus, 156 KING STREET EAST, HAMILTON, ONT.

The sash factory of The James Shearer Co., Montreal, was destroyed by fire, November 13th. Loss about \$10,000.

Mr. John Forman, importer of electrical supplies, etc., 644 Craig street, Montreal, announces in his advertisement in page 8 that he carries in his large and varied stock a full supply of calcium carbide in 100-pound tins, orders for which will be promptly filled. This will be an agreeable announcement, not only to the manufacturers, but the users also of acetylene gas apparatus, as the market has been rather bare of carbide for some time past. Acetylene gas has achieved a large and well-deserved reputation in Canada, and the consumption of carbide will be greatly increased now that it is known that the article can be had in unstinted quantities.

The Safety Light and Heat Co., Dundas, Ont., inform us that some of the recent sales made by them of their Cliff-Wardlaw Acetylene Gas Generators were as follows, regarding which the purchasers say:—R. Sparling, Vernon, B.C.—“The machine is working beautifully, and everyone is delighted with it.” J. & E. Lyons, North Bend, B.C.—“The machine is a dandy, and supersedes all other machines in this neighborhood.” T. A. Doncaster, Orillia, Ont.—“I would not be without it.” J. P. Callaghan, Hillsdale, Ont.—“The machine is working all

right. I am satisfied with it. The ash is always dry as you said it would be.” The B. Greening Wire Co., Hamilton, Ont.—“The gas machine is working well, and giving perfect satisfaction.” F. W. Watkins, Hamilton, Ont.—“The machine is satisfactory, and the light is beautiful.” C. W. Pabst, Seaforth, Ont.—“I have been using your machine for the past six months, and am well satisfied with it. The light is beautiful, and there is no smoke from it.” Wright Bros., Summerside, P.E.I.—“We are very much pleased with the machine you sent us.” John Wilson, Springhill, N.S.—“I am well satisfied with the machine you sent us.”

Application will be made to the Legislature of Ontario for an act to legalize by-law of the town of Newmarket, entitled “A by-law to raise the sum of \$5,000 to be expended in and towards erecting additional buildings in the town of Newmarket, for “The Office Specialty Company.”

Geo. H. Hees, Son & Co., Toronto, manufacturers of shades, blinds, etc., are erecting two handsome new buildings, which will be used respectively as factory and warehouse and will measure 200x50 feet, and 100x57 feet.

The Kennedy House, a leading hotel of Wabigoon, Man., was destroyed by fire Dec. 9th. The building was valued at \$4,000.

The steamer Telegram left early on Wednesday morning with a heavy load of supplies and a number of miners in charge of Capt. Wilcox for Michipocoten Island. About 60 men will be employed during the winter, opening up the old copper mine on the island, the property of Mr. Joseph Cozens of this town. Mr. Leopold of Chicago, Rockefeller, Flager and other prominent directors of the Standard Oil Company have taken a large interest in the property. These gentlemen are heavily interested in the copper mines of the south shore. Their connection with Michipocoten Island, if this venture proves a success, means an enormous development, as millions are behind these gentlemen.—Sault Ste. Marie Star.

The Roger Brown Company, of Tonawanda, N.Y., one of the largest sellers of pig iron on the continent, is contemplating the erection of a factory at Toronto. A stock company is being organized with a capital of \$400,000. The plant proposed would make 250 tons a day and employ 250 hands.

One of the richest zinc mines in Canada, has been discovered near Rossport, in the Lake Superior district, by the Grand Calumet Mining Company, Ottawa, who intend opening it up at once. The company have shipped 1,500 tons of ore during the past summer, principally to Antwerp, Belgium, the value of which was about \$30,000.

**REDDAWAY'S ORIGINAL**

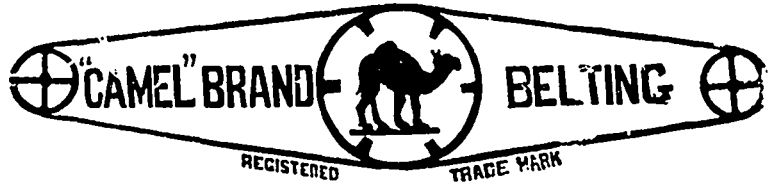
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**STRONGEST BELT MADE. NO STRETCHING.**

NOT AFFECTED BY DAMPNESS,  
HEAT OR STEAM.

WRITE FOR PARTICULARS. LARGE STOCK ON HAND.

Fire Hose, Steam Hose, General Mill Supplies.



**W. A. FLEMING & CO.,** SOLE AGENTS FOR CANADA, **57 St. Francois-Xavier St., Montreal.**

**The KAY Electrical Manufacturing Co.**

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Begs to announce that in future it will conduct its business under the name of

**The T. & H. Electric Co.**

HAMILTON, ONT.,

255-257 James St.

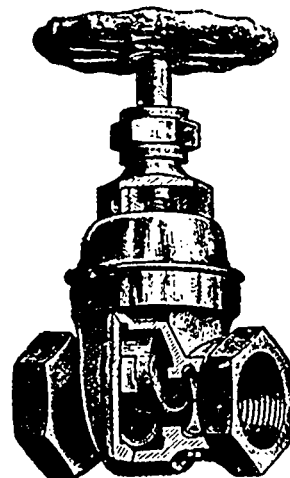
Phone 358.

TORONTO, ONT.,

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The WEBBER Patent  
**STRAITWAY VALVE.**



FOR.....  
Steam,  
Water  
OR  
Gas...

EVERY  
VALVE  
TESTED.

The Kerr Engine Co., (Limited),

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Sole Manufacturers for Canada. Send for Price List.

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LONDON, ENG.

**GENUINE EMERY**

Oakey's Flexible Twilled Emery Cloth.  
Oakey's Flint Paper and Glass Paper.  
Oakey's Emery Paper, Black Lead, Etc.

Prize Medal and Highest Award  
Philadelphia, 1876, for Superiority  
of Quality, Skillful Manufacture,  
Sharpness, Durability, and  
Uniformity of Grain.

Manufacturers....

**JOHN OAKEY & SONS, LIMITED,**

Wellington Mills, Westminster  
Bridg Road, London, Eng.

Inquiries should be addressed to

**JOHN FORMAN**

650 CRAIG ST., MONTREAL.



A special committee has been obtaining information as to the advisability of the city of Halifax, N.S., undertaking its own street lighting. Plans will be prepared and tenders invited for a suitable plant.

The machinery for the ropewalk at the Central Prison is in position, and a start will be made to turn out rope at once. About 1,000 bales of fibre have arrived at Toronto.

The British Columbia Wood Oil Co's buildings at Port Mendy, B. C., were destroyed by fire, November 19th. This was the only mill of its kind in Canada, and had just commenced business.

F. X. Tessier's abattoir, Montreal, was destroyed by fire, November 20th. Loss, about \$8,000.

The kid glove factory at city of Quebec, of Messrs. A. Pion & Co., was destroyed by fire, December 2nd. Loss about \$25,000.

The Arthabaskaville Railway Co., Arthabaskaville, Que., is asking for incorporation to construct a steam or electric railway from Dudswell to Maddington Falls.

Application will be made by the corporation of the village of Southampton, in the county of Bruce, to the Legislature of Ontario for an act to ratify a certain by-law of the village, entitled "A by-law for granting aid by way of loan and otherwise to the Southampton Manufacturing Company, of the village of Southampton."

Messrs. Samuel Denison & Son, proprietors of the Hunslet Foundry, Leeds, England, have sent in their new catalogue having reference to the Denison improved weighing machines, weighbridges, etc., manufactured by them. Some of the articles illustrated and described in the catalogue are automatic beam scales, cattle machines, cloth piece machines, coal machines, counter machines, dormant machines, equal weight machines, forge machines, automatic grain scales, hay and straw weighing machines, leather machines, locomotive wheel balancing machines, maltsters machines, millers scales, pillar work for weighbridges, pit bank machines, platform machines, spring balances, suspended machines, testing machines, weights, wire

testing machines, wool machines, etc. These machines and many others, and other specialties, are all illustrated and fully described, and we are told that all machines are plugged in conformity with the law after having been most thoroughly tested. For further information apply as above.

Messrs. Darling Brothers, proprietors of the Reliance Works, Montreal, as will be seen by their advertisement in page 6 of this journal, ask attention to Webster Vacuum feed water heater manufactured by them, regarding which they say that in proportion to the extent that feed water heaters in general are investigated and understood, the more that which they make is appreciated, for the reason that it represents maximum efficiency, economy, durability, convenience and simplicity, with the minimum requirements of attention, space, waste, repair and cost.

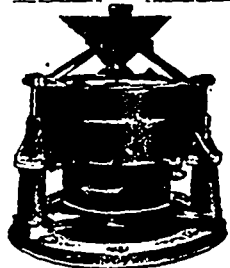
An oil belt has been discovered not far from the Crow's Nest Pass coal fields, supposed to have its origin in the coal beds. It is the only oil deposit in Western Canada.

**THE TORONTO PATENT AGENCY, (LIMITED)** . . . TORONTO, CAN.  
Head Office, 79, 80, 81 Confederation Life Building.  
CAPITAL, \$25,000.00.

Patents obtained. Patents sold on commission. Provincial rights sold. Most actual sales. Best results. Quickest work. Honest Treatment. Oldest company. Reliable references. All patent business promptly attended to. Valuation and prospects of any patent furnished on application.

**Pipe and Boiler Coverings, Engine Packings,**  
LUBRICATING OILS, GREASES, AND BOILER COMPOUND, COTTON WASTE, ETC.

**EUREKA MINERAL WOOL and ASBESTOS CO., 136 Bay Street, - Toronto.**



**ROCK**  
CRUSHERS

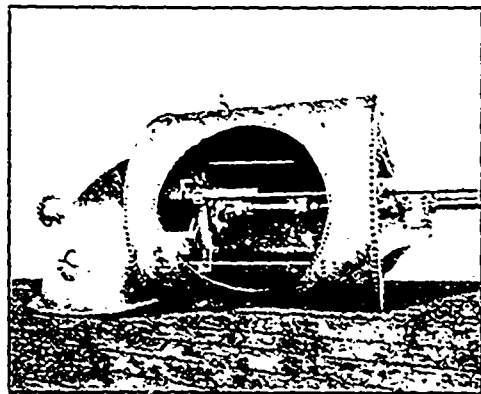
**EMERY**

**MILLS**  
AND  
MILLSTONES.

FRENCH BUHR AND ESOPUS STONES. *Send for Circular.*

**STURTEVANT MILL CO.**  
BOSTON, MASS.

**The Crocker Patent Turbine**



35-inch Crocker Wheel in Horizontal Setting, for Shipton Electric Light and Power Co., Danville, Que.

**WE MAKE A SPECIALTY OF SUPPLYING**

**COMPLETE WATER POWER PLANTS**

Designed to meet the working conditions in each instance, and to yield the highest efficiency obtainable thereunder. Every detail constructed in a thorough and substantial manner, and the whole equipment installed on the site by our own workmen, especially skilled in this class of work.

If you are interested in water power in any way, we should take pleasure in supplying you with information regarding our work in the above line.

Catalogue Free on Request. Correspondence Invited.

**The JENCKES MACHINE CO.**  
42 Lansdowne St., Sherbrooke Que.

The Manitoba Milling Company will build a grain elevator at Calgary, N.W.T.

C. Hiobert has installed a new 60 h.p. engine and a considerable amount of new machinery in his flour mill at Holland, Man.

W. H. Fowler will erect a flour and corn meal mill at St. John, N.B. The mill will be 100x40 feet, four storeys high.

A company from Anderson, Ind., will erect a glass factory at Toronto, where they will employ about 100 hands.

A chemical pulp mill will be established in the vicinity of Richibucto, N.B., the cost of which is estimated at \$200,000. It will have a capacity of 7,000 tons per annum.

The enhanced value of pulp wood has turned a large number of Algoma, Ont., farmers into the woods, and this winter's cut is expected to bring an unusually large amount of money into that district.

The North American Fence Supply Company, Toronto, is applying for incorporation with a capital stock of \$40,000, to manufacture machinery for fencing, etc.

The Glencoe Oil & Gas Co., Glencoe, Ont., has been incorporated with a capital stock of \$20,000, to construct works for the production of gas for heat, light and power.

A pamphlet has been issued descriptive of the advantages of Richibucto, N.B., as a centre for the manufacture of wood pulp. A map accompanies the letterpress, showing the watershed of that part of the province and the territory adjoining, from which a wood supply can be easily obtained.

The corporation of Greenville village, which is situated on the Quebec side of the Ottawa river, offers what is described as an almost unlimited water power along with four acres of land at a nominal rental. The

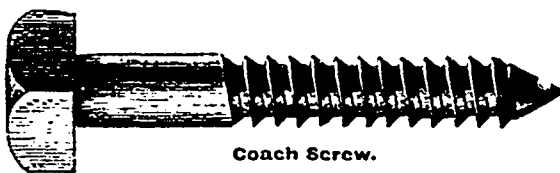
land is on the Long Sault, Ottawa river, and is between the canal and the river. As well as this practically free site and free power at a great natural power centre, there are offered exemption from taxation for twenty years and a large bonus. Of course the parties with whom such an arrangement would be entered into must be in a satisfactory position to carry out their part of the contract.

Mr. J. B. Appleby, of Toronto, representing a wealthy English and Scotch syndicate, has purchased a group of nickel and gold claims in the townships of Shakespeare and Hallam, about one and a-half miles from Webwood, on the C.P.R., near Sudbury, Ont. The company intend to start a diamond drill at work immediately. Mr. Appleby has also taken an option on the talc mine, owned by Harry Dreany, Fred. Lee and others. It is reported that the well-known Traulph nickel mine has been purchased by the above-named gentleman.

The Canadian-American Glass Company, of Detroit, Mich., is establishing a branch factory at Kingsville, Ont., where they will employ about 200 hands.

The artesian well sunk in the western limits of the city of Winnipeg, Man., for waterworks purposes, has proven a success beyond all anticipation. It filled before being completed, and though pumping water at the rate of 600,000 gallons daily, the level cannot be lowered more than four feet below the land surface.

Official notice is published in The Canada Gazette that the Canadian Power Company will apply to the Parliament of Canada, at its next session, for an act to extend its time for the completion of its works, to extend the bonding powers of the company, and to more particularly define its powers and to change its name. The name of this company should not be confounded with that of the Canadian Niagara Power Company, which latter company has exclusive rights in Queen Victoria Niagara Falls Free Park, and is controlled by the Niagara Falls Power Company. The two men who were prominent in the Canadian Power Company are Banker Paine, of Niagara Falls, Ont., and Mr. A. C. Dennison, of Philadelphia.



Coach Screw.

**WE**

**MANUFACTURE**

*Track Bolts and Nuts,  
Bridge and Roof Rods,  
Wrot and Cast Washers,  
Railroad and Contractors' Supplies,  
Carriage, Machine, Plow and Special Bolts,  
Bridge and Boiler Rivets, Drop Forgings of all Kinds.*

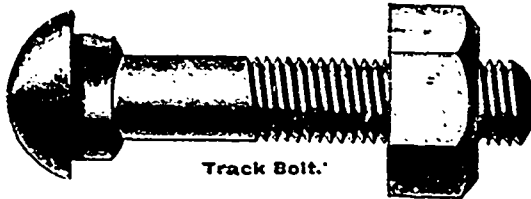
**The Swansea Forging Co.**

Limited,

**SWANSEA**

Near  
Toronto.

Send for  
Illustrated  
Catalogue.



Track Bolt.

**TAKE NOTICE!** Don't Use any more Poor Babbitt Metal, IT WILL SPOIL YOUR MACHINERY.

**The SYRACUSE SMELTING WORKS**

**332**

**William Street,  
MONTREAL, Canada,**



**AND  
Syracuse, N.Y.,  
U. S.**

Will furnish you with the best you ever used at reasonable prices. Quality and satisfaction guaranteed.

AGENTS IN CANADA:—A. R. WILLIAMS MACHINERY CO., Toronto.  
MECHANICS SUPPLY CO., Quebec. JOHN J. BARRY, St. John, N.B.  
H. H. FULLER & CO., Halifax, N.S.

**BUILDING IMPROVEMENTS IN TORONTO.**

The following shows the distribution of the building operations in the city of Toronto during the eleven months ending November 30, 1898 and bears out what has been said from time to time of the exceptional activity in building circles during the year, the total amount being nearly double the record for the full twelve months of 1897. The principal increases are in factory buildings and warehouses, the increase in the amount of factories being almost 400 per cent. over the record for the year ending December 31, 1897.

The classification of buildings for which permits have been taken out during the past eleven months is as follows :

153 Brick dwellings.....	\$ 477,300
132 Alterations and additions to brick dwellings.....	80,885
35 Rough-cast dwellings.....	29,350
49 Rough-cast dwellings, alterations and additions.....	15,015
25 Stores and offices.....	84,550
51 Stores and offices, alterations and additions.....	43,230
33 Factories.....	247,000
23 Factories, alterations and additions.....	91,590
23 Warehouses and additions..	211,200
7 Churches and additions.....	23,600
15 Schools and additions.....	124,300
3 Colleges and additions.....	57,200
7 Hotels and additions.....	54,200
2 Theatres and additions.....	27,200
2 Banks and additions.....	13,000
1 House of Industry and additions.....	15,000
1 Hospital and additions.....	4,000
37 Stables and sheds.....	34,760

Total to November 30th.....\$1,633,380

During the month of November building permits have been issued at the City Commissioner's office, Toronto, to the extent of

\$121,000, as compared with \$64,495 in November, 1897, and \$30,433 in November, 1896. This makes the total amount of building operations recorded at the City Commissioner's office since January 1, 1898, \$1,623,000. The total of the building in 1897 was \$951,130. For the first eleven months of last year the amount was \$897,730; so that the total from January 1st till November 30, 1898, is nearly double the total for the corresponding period of the previous year, which in turn showed a considerable increase over 1896. Already the present year has shown a much more promising return than has been witnessed since the collapse of the boom. There are, moreover, a number of large building enterprises in prospect which will considerably increase the total of the year, while architects and builders are confidently looking for an unusually busy spring. The Carling Brewing and Malting Company have taken out a permit for a two-storey warehouse on the east side of Simcoe street, to cost \$12,000. This brings the total of building permits issued during November up to \$121,000.

**THE CAMPBELL GAS ENGINE.**

The Campbell Gas Engine Company Halifax, England, have sent us a circular descriptive of the gas and oil engines made by them specially for driving electrical machinery. In the circular is an account taken from The Electrical Review, of London, England, having reference to the work done at the New Palace Theatre, at Plymouth, England, by four 25 brake h.p. Campbell gas engines in driving the electric light equipment of that concern, the installation consisting of 1,200 incandescent and six arc lamps.

The company, alluding to the departure in their business in the manufacture of this line of machinery, say that having been called upon to supply several of their oil engines for electric lighting purposes, they decided a short time ago to introduce an oil

engine specially for this work, which has proved a great success.

To absorb the irregularities in speed due to the peculiarities of the "Otto Cycle," on which all oil engines are constructed, and the irregularity caused by changes in load, their special engine is fitted with one heavy fly wheel of large diameter. The crank-shaft is provided with a third or outer bearing, so preventing any undue strain being put on the shaft, which would be the case if the fly-wheel was unsupported or overhung.

The moving parts of the engine are balanced as nearly as possible by weights fixed rigidly on the crank webs.

Automatic lubrication is provided for the crank pin, so that long runs can be made without stoppages for oiling purposes.

The engine is also provided with a special governor, driven direct from the crank-shaft of the engine, independent of other gearing

...THE...  
**McINNES INDICATOR**

(Patented).

With Vulcanite Sheathing for all Speeds and Pressures. Adopted by the British Admiralty.

**SPECIAL INDICATORS**

FOR GAS AND EXPLOSIVE ENGINES,  
AMMONIA COMPRESSION MACHINES,  
TORPEDO BOATS,  
LAUNCHES AND LOCOMOTIVES.

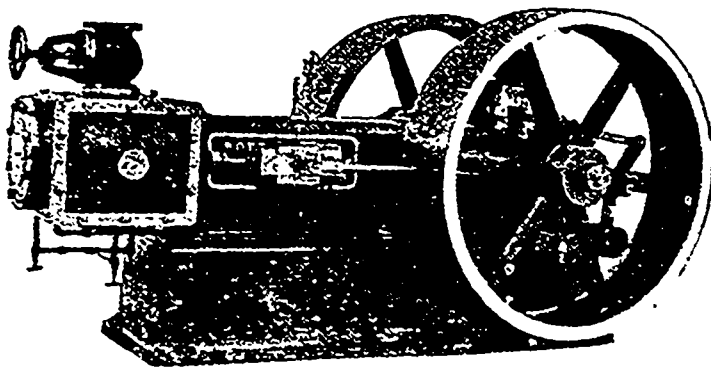
Patent Flexible Unstretchable Wire Cord  
For Indicator Leads.

Catalogue on application.

SOLE MAKERS:

**T. S. McINNES & Co., Limited**  
42 CLYDE PLACE,  
GLASGOW, - Scotland.

**The New "BELL" AUTOMATIC ENGINE**



FOR  
**Electric Lighting, Electric Railways**  
**MANUFACTORIES, MILLS.**

Unsurpassed for  
**ECONOMY, PERFECT BALANCE, ABSOLUTE REGULATION, SMOOTH RUNNING**  
SEND FOR CATALOGUE.

Manufactured only by

**ROBERT BELL, Jr.**

Hensall Engine and Machine Works,

**HENSALL, ONT., CANADA.**

**B. GREENING WIRE CO. (LIMITED)**  
WIRE MANUFACTURERS & METAL PERFORATORS  
**HAMILTON & MONTREAL.**

Wire Screens for Every Class of Material.

Perforated Metal of Steel, Copper, Brass, Zinc for all purposes.

Special Attention given to Miner's Requirements.

by means of skew-gear wheels with machine-cut teeth.

Every detail of the engine has been carefully studied to fit it for exacting and continuous work.

It is provided with a special splash cover over the crank, and oil trays are fitted to the bed to catch the waste oil.

From experiments that they have made with these engines, they find that the variation in speed does not exceed two per cent., so that these engines can be absolutely relied upon for the steady running of incandescent lamps.

**32-INCH VARIETY LATHE.**

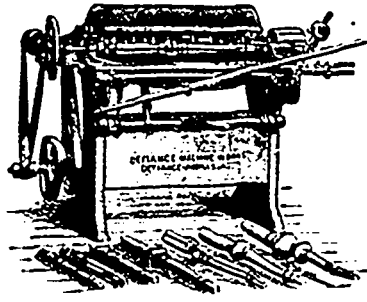
The accompanying illustration is of a 32-inch Variety Latho, manufactured by the Defiance Machine Works, Defiance, Ohio.

This lathe is especially designed for turning table legs, stair balusters, ball bats, croquet mallets, piano stool posts, indian clubs and various other shapes of fancy turning, or plain work where exact duplicates and accuracy are required.

The frame is a trunk casting, cored out, making it exceedingly stiff and strong without unnecessary weight. The machine is built in seven different sizes to turn material up to the following lengths: 24 in., 32 in., 38 in., 42 in., 48 in., 52 in. and 58 in. These are extreme lengths which the different machines will turn. They, however, will turn anything shorter than the lengths given.

The spindle is made of forged steel, running in genuine babbitt metal bearings made in halves and provided with self-lubricating oil collars and cups.

The cutter heads each carry three knives, with their cutting edges chaped to suit the style of work desired to turn. It requires different heads and knives for different styles of work, but with any one set of heads and knives the machine can be adjusted by the use of an inexpensive cam for turning the



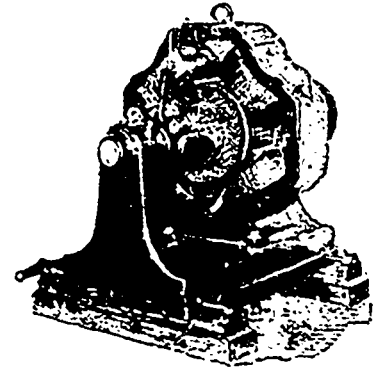
32-inch Patent Variety Lathe.

same shape of beads in round, oval, hexagon, octagon and square without any change whatever in the cutters. A moment's time is required to change the machine from any one of the shapes specified.

The table is operated by a convenient hand-lever, and it slides upon planed V-shaped ways, and is gibbed to the frame.

The table is provided with adjusting screws at each end for regulating the diameter of

**The Electrical Construction Co. of London, Limited.**



**MULTIPOLAR MOTORS & DYNAMOS**

And Direct Connected Plants for Isolated Lighting.

Repair Work a Specialty.

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**To MANUFACTURERS**

Do not be misled on the Wood Pulley question! The construction of the Dodge Split Pulley is unique. The complete and extensive plant of Dodge Manufacturing Company, of Toronto, makes it possible for them to make an all-wood pulley nearer perfection than any of its competitors. No other wood pulley is made just like the Dodge Pulley, because a lot of special and expensive machinery was necessary before the Dodge Pulley could be produced in its present state of perfection.

Our output exceeds that of all other wood pulleys combined. There are no drawbacks with us, we have the best wood split pulley made, and we want to send you our new 260 page Catalogue, also our revised Discount Sheet and to tell you all about all kind of pulleys.

We carry a complete stock of pulleys in sizes from 4 in. diam. to 60 in. diam. any face, and can ship most any order on day received. A post card or a 'phone will bring us to you at any time.

**DODGE MANUFACTURING CO. of Toronto, Limited,**  
Office, 74 York St., Toronto, Ontario. Works, Toronto Junction. 'Phone 2080

**To MANUFACTURERS...**

Bar Iron, Steel, Boiler Plate,  
Rivets, Tube Expanders,  
Hammers, Metallic Letters  
and  
Figures for Patterns.

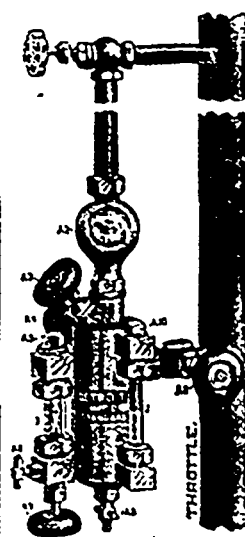
**RICE LEWIS & SON**

(LIMITED)

COR. KING AND VICTORIA STREETS, TORONTO.

ADVERTISE IN THE CANADIAN MANUFACTURER.

SEND FOR RATES.



**THE BEST JUDGES OF ENGINES**

THOSE WHO BUILD HIGH-GRADE ONES ALL USE

**The Detroit Sight-Feed Lubricators**

This is equally true of Canadian as of American engine builders. They know that the valve friction must be overcome if their engines are to work at their best. They know from experience that the Detroit Lubricators do this, and where so much is at stake they want only the best. It should be the same with all engine owners. The saving our Lubricators effect will pay for themselves very soon.

Send for Catalogue and Prices.

**Detroit Lubricator Co.,**  
DETROIT, MICH.

turning. This can be instantly accomplished, and the diameter of turning may be varied from the smallest size up to 5 in. The head stock contains a spur center, which is rotated by a belt from the cutter head spindle to a sub-counter attached to the base of the machine, thence to tight and loose pulleys, which are movable, with the table so arranged that the belt for driving the feed is automatically shifted as the table is moved in and out, rotating the material to be turned as it advances toward the cylinder, and stopping it automatically when the table is moved back to the proper position to remove the turned object from the centers after the turning is performed.

The operation of this machine is quick and simple. The material to be turned is placed between the centers in its rough state, with square corners if desired, and moved to the cutter heads by the hand-lever, when it is reduced to its proper diameter and shape its entire length at one and the same time.

With the knives kept in proper order, the work is turned smooth so that no polishing is required. Sharp corners, small curves and fine beads can be cut without breaking down or lifting the fibre.

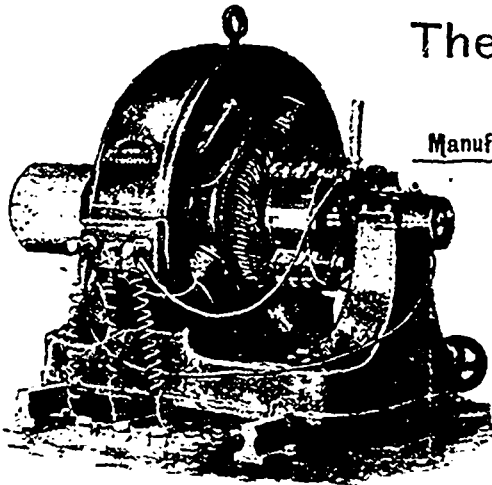
The capacity of this machine depends somewhat upon the style of work, varying from 1,000 to 3,000 pieces per day. Round, oval, oblong, square, hexagon or octagon shapes can be turned with equal success. Samples of the work at the base of the machine represents some of the different shapes that can be successfully produced with this machine. Before prices can be quoted for these machines, it will be necessary for us to have a full size drawing of the different shapes to be turned.

The counter is furnished as follows: Shaft, 2 1/2 in. diameter Two No. 2 adjustable drop hangers. Driving pulley, 30 in. x 6 in. Tight and loose pulleys, 14 in. x 6 in. Speed, 600 rotations per minute. Pulley on machine, 8 in. diameter, 6 in. face.

**THE SUNLIGHT ACETYLENE GAS GENERATOR.**

The Sunlight Gas Company, of Montreal, recently incorporated, and of which Mr. C. C. Corneille, of Messrs. McArthur, Corneille & Co., that city, is president, has begun the manufacture of acetylene gas machines.

This company have acquired from Hon. D. L. Baumgarten, of Cincinnati, Ohio, the inventor of the "Acme Sunlight Gas Generator," exclusive title of his Canadian patents for the Dominion of Canada. The Acme Sunlight Generator is, the company claims, constructed on lines entirely novel and different from most other machines. The carbide is kept in small airtight boxes varying in size according to the capacity of the machine. These boxes are placed in a circular carriage running around the machine, and the contents of each box is automatically dropped into a water sealed chute leading to the auxiliary generator box at bottom of machine, one at a time, whenever the gasometer needs to be replenished with gas. When the lights are turned out, the machine automatically ceases its work, the unused gas



**The Jones & Moore Electric Co.,**

Manufacturers and Contractors

All Work Fully Guaranteed

**ELECTRIC LIGHT and POWER PLANTS a Specialty**

A Few Second-Hand A 1 Machines For Sale Cheap

20 and 22 ADELAIDE STREET WEST TORONTO

**ACETYLENE...** THE FUTURE LIGHT  
The Perfect Light for Public Buildings, Offices, Stores and Dwellings.

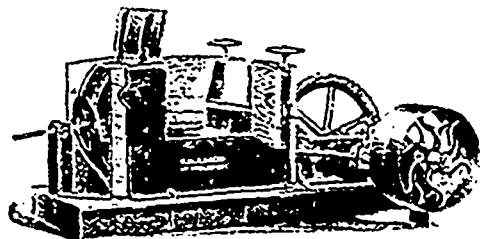
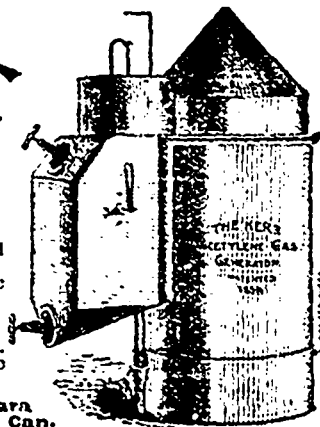
**The Kerr Acetylene Generator**

Patented in Canada, Great Britain, United States, France and Germany. Other Canadian and foreign patents pending. The only perfect apparatus for the generation of Acetylene Gas from Calcium Carbide. Neat, Compact and Durable.

**SIMPLE, SAFE AND RELIABLE**

No Valves or complicated Mechanism to mystify and confuse. No Copper, Brass, or other dangerous element used in its entire construction. Write us your requirements and obtain prices.

**KERR ACETYLENE GAS GENERATOR CO.,** box Niagara Falls, Can.



**H. W. KARCH**

HESPELER, ONT.

**IRON FOUNDER and MACHINIST**

Manufacturer of

**WOOLEN MACHINERY,**

Rotary Fulling Mills, Kicker Fulling Mills, Soaping Machines, Cloth Washers, Wool and Waste Dusters, Rag Dusters, Drum Spool Winders, Reels, Spooling and Doubling Machines, Ring Twisters, Card Creels, Dead Spindle Spooler for Warp or Dresser Spools, Patent Double-Acting Gig Dyeing Machines.

**Engine Packing,**

**Magnesia Pipe Covering**

**Lubricating Oils**

**and Grease.**

The **William C. Wilson Co.**

Limited

24 FRONT STREET EAST

TORONTO, ONT.



**DIRECT FROM THE GREAT MINES**

of British Columbia and Northwestern States. Handsome cabinet of specimens with catalogue describing each specimen and the different mines from which they were obtained. A BEAUTIFUL PRESENT. A SCHOOL OF MINES IN ITSELF. Price, Express paid, \$1.25. JNO. R. CASSIN CO., Mine Promoters & Assayers, Spokane, Washington, U.S.A.

remaining stored in the water-sealed gasometer until lights are again lit up (put on). The carbide in the small boxes in circular carriage is not exposed to water or moisture until needed, when it is automatically dumped into the auxiliary generator box as before described.

The gas generated in the auxiliary generator box is so arranged as to be entirely in water, and on its way to the gasometer at top of machine passes through the water in the main body of tank, arriving cool, purified and free from all impurities into the gas holder, thus insuring perfect combustion, and consequently freedom from smoke or odor in the room. By this system there is no unnecessary waste of carbide, either through use or exposure to moisture, making at the same time the most economical, reliable, safe and easily managed acetylene gas generator yet produced.

The carbide boxes can be refilled with carbide at any time, night or day, without interfering with working of machine.

The residuum in the auxiliary generator box can also be cleaned out at any time, without taking the machine apart or disturb-

ing its work in any way. These are very important features, and highly necessary to insure a positive, never-failing light.

The advantages of acetylene are—

1. It is the most brilliant and beautiful light ever discovered. It gives fifteen times the light of ordinary illuminating gas per cubic foot.

2. It is a pure white light, its rays being almost identical with sunlight, showing all colors perfectly.

3. Its rays are diffused in excess of all other illuminants, so that the actual light is far greater than above stated. It literally produces sunlight.

4. Its combustion is perfect. There are no noxious products, no odors and no smoke. The vitiation of the air in a room compared with ordinary gas is one to eight.

5. It produces a distinctively cool flame. The same amount of light has only one-sixth the heat of city gas.

6. Its cost is far less than that of any known illuminant. It is made of cheap and almost universal materials, coal and lime, fused by electric heat. It will be in this respect the light of the masses.

7. The cost of delivery and operation will be much less than under other systems. There will be no costly system of underground mains, no leakage, no expensive charters.

8. Every householder in the city or country can have a generator attached to his house-pipes, change his large burners to half-foot or one-foot burners, and at once secure a perfect light. No special knowledge or skilled labor is required, and there is no danger.

9. It is especially adapted to light houses, buoys, ships, street and railway cars, locomotives, bicycles, street lamps, and has a thousand other uses, not only for lighting, but also for heat and power.

10. It will not freeze, being unaffected by heat or cold. It can be cooled to 100 degrees below zero, or heated to 600 degrees above, without impairing its illuminating power.

11. It will not clog the burners, and there is no residuum or deposit in the pipes.

12. It is safer than any other illuminant. It has the same dangers as ordinary city gas, but in a lesser degree.

13. The entire apparatus is simple and in-

## FETHERSTONHAUGH & CO.

PATENT BARRISTERS AND SOLICITORS

ELECTRICAL AND MECHANICAL EXPERTS AND DRAUGHTSMEN

Head Office: Canadian Bank of Commerce Bldg., Toronto, Ont.

**Patents** Procured in Canada and all Foreign Countries.

Offices in Montreal, Que., Ottawa, Ont., and Washington, D.C.

# THE WM. HAMILTON MFG. CO., LIMITED,

Engineers and Builders

## MODERN MINING and MILLING MACHINERY

# "Gyrating Vanner"

SHAKES LIKE A PAN—SEND FOR SPECIAL CIRCULAR



Department "E"



Contractors for the Design and Construction of Complete Stamp Mills, Concentration, Chlorination, Cyanide, and Smelter Equipments....



PETERBOROUGH, ONT., or VANCOUVER, B.C.

expensive. All costly fixtures and burners for increasing the light or economizing the gas can be at once discarded.

14. Simplicity, safety, efficiency and low cost can be demonstrated to the satisfaction of every unbiased mind.

15. Nothing is left to guess work in generating its gas with the "Acme Sunlight Gas Generator." The generator works with a positive action, feeding a given quantity of carbide directly into a permanent body of water automatically, thus insuring safety, simplicity and economy, as every particle of gas contained in the carbide is immediately stored for consumption in the gasometer, thereby obviating the necessity of exhaust and waste pipes.

The Acme Sunlight Gas Generator can be furnished in all sizes, from five lights up to 5,000, according to needs and desire of purchaser. These machines are specially adapted to churches, convents, schools, printing establishments, private residences, stores and hotels, etc.

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Toraline B. is a direct blue black for wool, and is a compound made from the coloring principle of logwood. Owing to the great attraction which wool has for this coloring matter, no mordant is necessary, either before or after the dyeing operation. Any required black (a jet or a dead black) can be obtained with the usual additions which are necessary to obtain the logwood black. It is specially suitable for low-class shoddy dyeing, and has the following advantages:—Cheapness, fastness to light, level dyeing, saves time, steam and labor, stands scouring

and milling perfectly, is a powder and therefore easily handled.

Recipe: Prepare a bath containing fifteen pounds Toraline B. Enter goods at 160° F., raise temperature to boil and boil  $\frac{1}{2}$  to  $\frac{3}{4}$  of an hour, lift and wash. The dye-bath is retained for future use, and for succeeding lots of goods relatively smaller quantities of dyestuffs are required.

Pluto Brown R. Up to the present time a want has been felt for a cotton brown fast to acids. Pluto brown R. meets this requirement to a great extent, and is even unaffected by dilute mineral acids. This feature make the above color of use in the dyeing of stocking yarns, hosiery, etc., especially as its fastness to washing may be considerably increased by dazotising and developing without altering the soft handle of the goods. Is also of use in the dyeing of half wool, dyes the wool and cotton same color. One of its chief recommendations lies in its strong tinctorial power, relatively small quantities of dyestuff producing deep, full shades.

Benzo Dark Green B. Another member of the benzo green family, applicable in the same manner as benzo green G. B. and 2. B. Dyes full, deep bottle green shades. Especially suitable for half wool dyeing, as it dyes both fibres equally level. In tinctorial power it is very strong, and will be of interest to dyers, dyeing half wool eskimo goods i. one bath, a special card of which has just been prepared No. 699-1898. For shade cards or more complete information about any of the recent colors, write the Dominion Dyewood & Chemical Co., Toronto, sole agents in Canada for the Farbenfabriken, vorm. Friedr Bayer & Co., Elberfeld, Germany.

Application will be made to the Legislature of Ontario for an act to legalize and confirm by-laws of the following municipalities.—By-law of the township of Adolphustown, granting a bonus of \$1,000 for the promotion of the Napanee Packing and Provision Co.; by-law of the township of Camden, granting a bonus of \$7,000 to the said company; by-law of the township of North Fredericksburg, granting a bonus of \$4,000 to the said company; by-law of the township of South Fredericksburg, granting a bonus of \$4,000 to the said company; by-law of the township of Richmond, granting a bonus of \$6,000 to the said company; by-law of the township of Ernestown, granting a bonus of \$7,000 to the said company; by-law of the town of Napanee, granting a bonus of \$6,000 to the said company, and granting exemption from taxation of the property of the said company for ten years.

There are over one million bushels of western grain now at Owen Sound, Ont., and the Canadian Pacific Railway are running about six train loads a day out of that point, through to Montreal for export to the Old Country. Recently there were in the elevators at Owen Sound 800,000 bushels of grain, there were 300,000 bushels in vessels at the dock, and 500,000 bushels are on the way from Chicago. Grain from the Canadian Northwest has been coming through in larger quantities the past few days, and the traffic returns are expected to be more favorable this week on that account. The freight business on the Grand Trunk is exceptionally heavy at the present time.

The Canadian Pacific Railway Station at Virden, B.C., was destroyed by fire, November 20th.

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THE CANADIAN RAND DRILL CO. have moved their General Sales Office, controlling Canadian Territory, to 18 Victoria Square, Montreal, in order to facilitate their business, which has been rapidly increasing during the last two years. They have established an office at 88 York St., Toronto, one in Halifax, one in Rat Portage in charge of Mr. George J. Ross, and one in Rossland in charge of Mr. Mendenhall. They are as usual manufacturing largely along the lines of duplex construction which they have advocated from the first. A duplex compressor costs a little more in the first place than a straight line machine, but the difference in economy of the two offsets the difference in price. Their Toronto office has lately contracted with the Canadian Copper Co., the largest nickel producers of Canada, for a very large mining plant. The Canadian Gold Fields of Marmora, they have also just equipped with a large Corliss Compressor.

Through the Halifax office the Intercolonial Coal Mining Co., of Westville, are also installing one of their high class machines for pumping. Duplex construction permits of an economical arrangement of cylinders in proper ratio to the steam pressure at hand, and to the air pressure required.

The Rat Portage office last year installed from start to finish a large plant at the Sultana mine, a large plant at the Foley mine, and also a large plant at the Mikado. They are now putting in machinery at the Cameron Islands mine, and also a large plant for the Boulder Gold Mining Co., which is controlled by Mr. Leclair and other American capitalists.

The Rossland branch has rather the advantage of the others in that it has a large warehouse at its back and is able to fill orders from stock. They have lately contracted with the Knob Hill mine for a large power plant and two mining plants, the object being for the second mining plant being supplied with power from the one Compressor located at Knob Hill.

**MECHANICAL DRAUGHT FOR STEAM BOILERS.**

BY WALTER H. SNOW,

Of the Engineering Staff of the B. F. Sturtevant Co., Boston, Mass. From a Lecture Delivered at Sibley College, Cornell University.

The chimney has long stood as practically the only available means of producing draught, which, thus produced, has commonly been called "natural draught." If it satisfactorily met all of the requirements of modern boiler practice, one would scarcely expect to see a substitute proposed.

Primarily introduced for the purpose of increasing the rate of combustion, artificial draught was designated as "forced draught," its field of application being considered to begin where that of the chimney ended. By later refinements it has, however, become not only a means of assisting chimney draught, and of producing the conditions requisite to accelerated combustion, but it is now accepted as a convenient and efficient substitute for the chimney under all ordinary conditions.

Artificial draught may be produced by means of steam jets inducing a flow of air, by blowing engines, by air compressors, by positive rotary blowers and by fan blowers or exhausters. The fan has been most extensively applied under all conceivable conditions, until it has become the symbol of artificial, or, as it may properly be designated, of mechanical draught, and is to-day the accepted substitute for the chimney.

It is hardly necessary to here recite the history of the gradual development of this system of draught production. Suffice it to say that at the present day the subject of mechanical draught engages the attention of

every progressive engineer in the design of a steam generating plant.

Two types of fans exist. The first, known as the disc or propeller wheel, is constructed on the order of the screw propeller, and moves the air in lines parallel to its axis. Because of its inability to operate against high pressures it is practically valueless for draught production. The second, or fan blower proper, consists, in its simplest form, of a number of blades extending radially from the axis, and presenting practically flat surfaces to the air as they revolve. By the action of the wheel the air is drawn in axially at the centre, and delivered from the tips of the blades in a tangential direction. This type may be simply designated as the centrifugal fan, or, more properly, as the peripheral discharge fan.

The chimney as a means of creating a movement of air depends upon the heating of that air, by which a difference in density is produced. The heat thus employed is, however, absolutely wasted so far as its utilization for any other purpose is concerned. Any attempt to extract more of the heat from the gases as they escape from the boiler must, with a given chimney, result in a reduction of the draught. This inherent loss with an ordinary coal actually amounts

to about twenty per cent. when the gases are at 500°, and the excess of air is 100 per cent. Evidently such a great loss as is thus possible should require energetic effort to secure its reduction by means of a more economical substitute for the chimney.

It may be shown that when no work is lost in friction, and the respective temperatures of the external air and the chimney gases are 62° and 500°, the theoretical efficiency of a chimney 100 feet high will be only about six ten-thousandths. In practice the resistance of the chimney, the cooling of the gases and other causes combine to reduce even this extremely low efficiency.

If in the place of the chimney there be substituted an engine-driven fan of proper size, the resultant of the efficiencies of the steam boiler, the engine, and the fan, together with the loss of friction in the apparatus, may be reasonably taken at about four per cent. Therefore, the work done, or its equivalent in heat units expended to produce the given result, will be about seventy times as great in the case of a chimney as in that of a fan.

All other questions aside, the fan is, therefore, far more economical than the chimney. This economy means that when a fan is employed, the surplus heat can be utilized and

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the gases reduced to a minimum temperature before they escape, without impairing the draught.

The methods of application of mechanical draught may be broadly classified under two heads—the plenum and the vacuum methods. Under the plenum, or “forced,” draught method the air may be supplied in either of two ways. First, by making the ashpit practically airtight, and forcing the air into it. Second, by making the fire-room itself practically airtight, and maintaining therein the required air pressure.

Under the vacuum or “induced” method there is practically only one means of application—the introduction of an exhausting fan in the place of a chimney. A short and comparatively light stack usually serves to carry these gases sufficiently high to permit of their harmless escape to the atmosphere.

Evidently the method of application to be adopted must depend upon circumstances. It cannot be said that under all conditions any one of these three principal methods, or

their numerous modifications, is superior to the others.

The application of mechanical draught presents a three-fold opportunity for increased economy in steam production. First, in the reduction of avoidable losses; second, in a decrease in the first cost and resultant fixed charges on the entire generating plant; and third, in a reduction in the operating expenses, principal among which is the cost of the fuel. In addition, mechanical draught possesses certain advantages which cannot be directly measured in money values, such as its peculiar adaptability to the requirements, its independence of climatic conditions, its flexibility and the like.

Nearly forty years ago, Rankine wrote that “in furnaces where the draught is produced by means of a blast pipe, like those of locomotive engines, or by means of a fan, the quantity of air required for dilution, although it has not yet been exactly ascertained, is certainly much less than that which is required in furnaces with chimney

draughts: and there is reason to believe that on an average it may be estimated at about one-half of the air required for combustion.” Such has since proved to be the fact.

Theoretically, the amount of air chemically required for the combustion of one pound of coal is about twelve pounds; but practically, with chimney draught, the amount actually supplied, including that resulting from leakage, is far in excess, and varies greatly under different conditions. Donkin and Kennedy have shown by gas analyses that, in the case of sixteen different plants, the air supply ranged between fifty-six per cent. and 328 per cent. in excess of the chemical requirements.

A high furnace temperature and low stack temperature, other things equal, are evidently conducive to greater efficiency. It has just been shown that such conditions are incident to a reduction in the excess of air supplied. But perfect combustion with a small supply of air will result only when it is intimately distributed throughout the fuel. For such intimacy of contact intense draught and a clean and reasonably thick fire are necessary, conditions which may be most readily maintained by means of mechanical draught.

With a thick fire the air is compelled to come in contact with a greater amount of fuel, and afforded a better opportunity to promote perfect combustion. This points to the efficiency of reasonably high rates of combustion. When secured under proper conditions, with a given grate area and boiler, any increase in the rate must be accompanied by an increase in the total air supply, and hence a probable increase in the temperature of the escaping gases. But if the total consumption remaining the same, the grate area be reduced, the rate of combustion per square foot of grate will of necessity be increased, and the efficiency of combustion may be greater. Clark states that “the proportion of surplus air required appears to diminish as the rate of combustion and the general temperature in the furnace is increased,” and that “the system of forced



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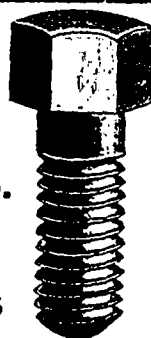
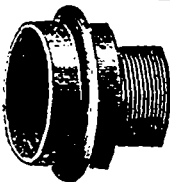
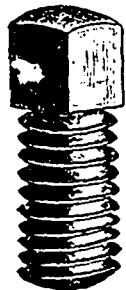
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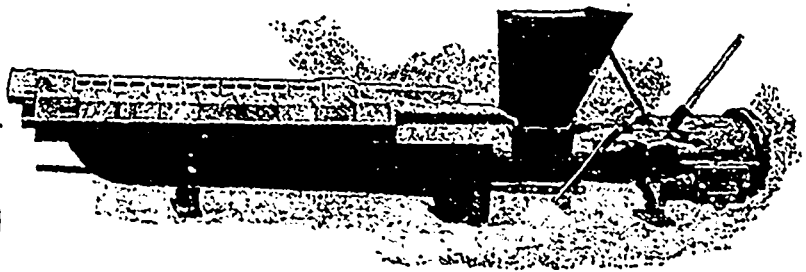
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draught opens the way for increase of efficiency in facilitating the adoption of grates of diminished area in combination with acceleration of combustion."

With a decreased supply of air, the intensity of the fire is increased, its temperature is higher, more heat is radiated to the exposed boiler surfaces, and more is taken up by the gases. Furthermore, the diminished superficial area of the grate and of the exposed interstices between the fuel necessitates a higher velocity to secure the admission of a given volume of air. This increased velocity in turn requires greater draught or air pressure.

Undoubtedly the source of the greatest loss in boiler and fuel efficiency lies in the usual high temperature of the escaping gases. In seventeen independent boiler tests, Donkin & Kennedy found the heat lost up the stack, when no economizer was used, to range between 9.4 per cent. and 31.8 per cent. of the total heat of combustion.

With the chimney, a comparatively high temperature of the rejected gases is an absolute necessity for the production of the draught. Its production by means of a fan is, on the other hand, independent of the temperature of the gases, and there is, therefore, opportunity to utilize the heat which is a positive and unavoidable loss in the case of a chimney. In this direction lies one of the greatest opportunities for increasing boiler efficiency.

We may now consider the influence, from a commercial standpoint, which the application of mechanical draught exerts upon the aggregate first cost of a steam boiler plant. For this purpose there has been selected a plant of reasonable size of which the detailed cost is known. This plant consists of eight modern water tube boilers, each of 200 horse power normal rating, set in pairs, making a total of 1,600 horse power. A chimney is provided, eight feet in internal diameter and 180 feet high, of sufficient capacity to overcome the resistance of the two feed-water economizers and produce the draught necessary for any probable forcing of the boilers. The detailed cost of that portion of the plant which concerns the present

discussion is, in round numbers, as follows:—

8 water-tube boilers of 200 horse-power each .....	\$25,000 00
2 feed-water economizers .....	7,000 00
Boiler and economizers, setting and by-pass .....	6,000 00

Automatic damper regulator and dampers .....	300 00
Chimney, complete .....	9,000 00
Building, complete .....	11,000 00
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	\$58,000 00

In the other plan there are two fans, each



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As we shall not be able to personally visit each manufacturer, it is for this purpose that we publish this advertisement. This is our agent who is going about to solicit a share of your patronage. We are thankful for the patronage extended to us in the past, and hope that we may secure an extension of the favors for the future.

All correspondence relating to the following Tools will be promptly answered, viz:

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| <b>LATHES</b> —Engine, Gap, Break, Turret, Fox, Spinning, Etc. | <b>SHAPING MACHINES</b> —Whitworth, G. & E., Rack-Driven, Etc.      |
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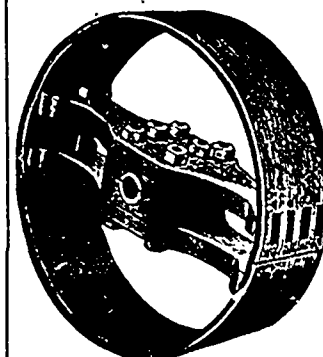
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driven by a separate engine. Each fan is capable of independently producing the draught for the entire plant, and thus serves as a relay, if desired. Such an apparatus, with the short stack, can be installed complete, under ordinary conditions, for about \$3,500 (£700). The total economy in first cost effected by the introduction of the mechanical draught plant, which amounts to a reduction of about sixty-two per cent., may be indicated as follows; the saving of space occupied by the chimney being neglected:—

<b>Chimney Draft.</b>	
Cost of chimney.....	\$9,000 00
Cost of damper regulator and dampers .....	300 00
	\$9,300 00

<b>Mechanical Draft.</b>	
Cost of fans, engines, draft regulator and short stack, installed complete.....	\$3,500 00
Saving by use of mechanical draft	5,800 00
	\$9,300 00

A still further reduction might have been secured by designing the plant so as to operate the boilers at somewhat above their rated capacity, as could be readily done by means of the same mechanical draught apparatus. The omission of one boiler would bring the rated capacity down to 1,400 horse power, and would call upon the fans to increase the steaming capacity of the other boilers by only about fourteen per cent. above the normal. This would show an additional saving in first cost which may be thus presented:—

<b>1,600 Nominal Horse Power Plant.</b>	
Cost of 8 boilers .....	\$25,000 00
Cost of settings, etc.....	6,000 00
Cost of building .....	11,000 00
	\$42,000 00

<b>1,400 Nominal Horse Power Plant.</b>	
Cost of 7 boilers .....	\$21,875 00
Cost of settings, etc., about .....	5,500 00
Cost of building, about.....	10,500 00
Saving by use of mechanical draft	4,125 00
	\$42,000 00

This shows a possible supplementary saving on the entire plant of \$4,125 (£825), which makes a total reduction of \$9,925 (£1,985) to be credited to the account of the mechanical method. Of course the fixed charges for interest, taxes and insurance will

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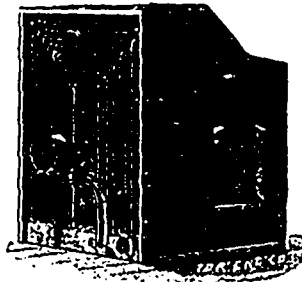
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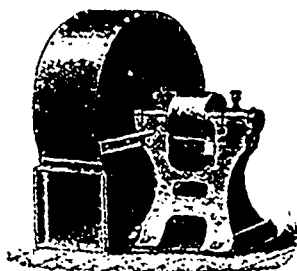
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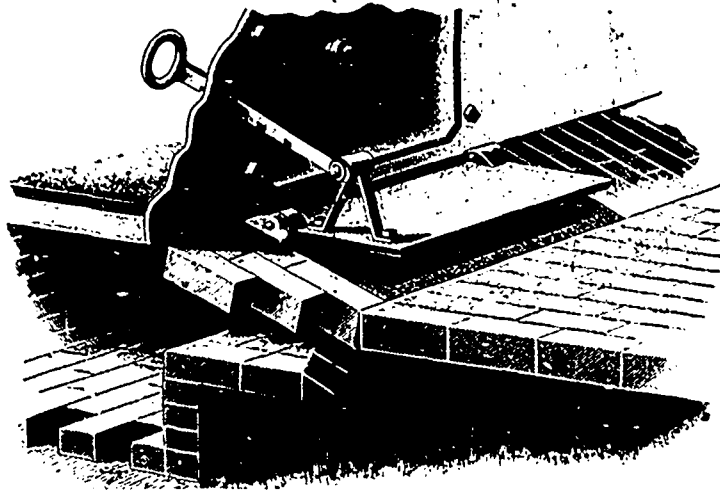
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be correspondingly reduced. Had this comparison been based upon the cost of a plenum or forced draught plant, the saving in the cost would have been shown to be even greater because of the smaller fan required.

save \$990 (£198), and the reduction in the number of boilers \$960 (£192) on the cost of the land required for the plant.

The total net saving in first cost of a single plant, under the given conditions, may be thus summarized:—



Sturtevant Ash Pit Damper in bottom of Ash Pit.

In any properly arranged plant the exhaust steam from the fan engine would be utilized so that the actual cost of the steam used in producing draught would be reduced to practically nothing.

The value of the land may be an important factor in the first cost. If figured at \$2 (8 sh.) per square foot, for instance, the omission of the chimney would in this case

By omission of chimney and damper .....	\$5,800 00
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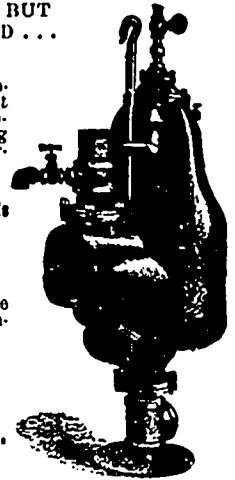
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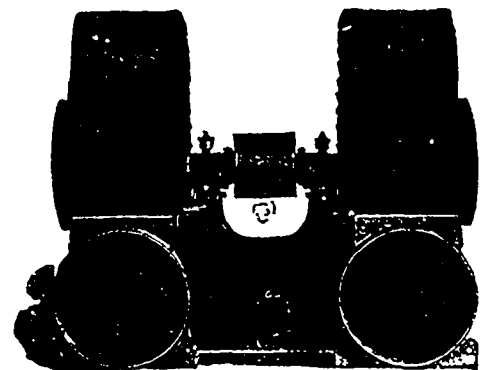
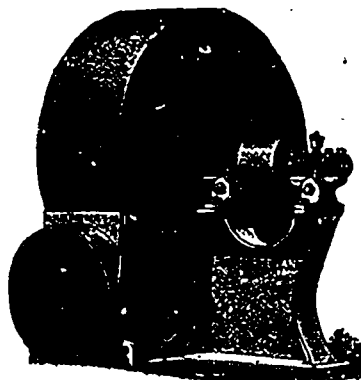
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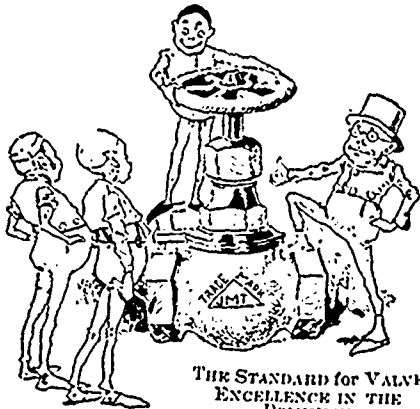
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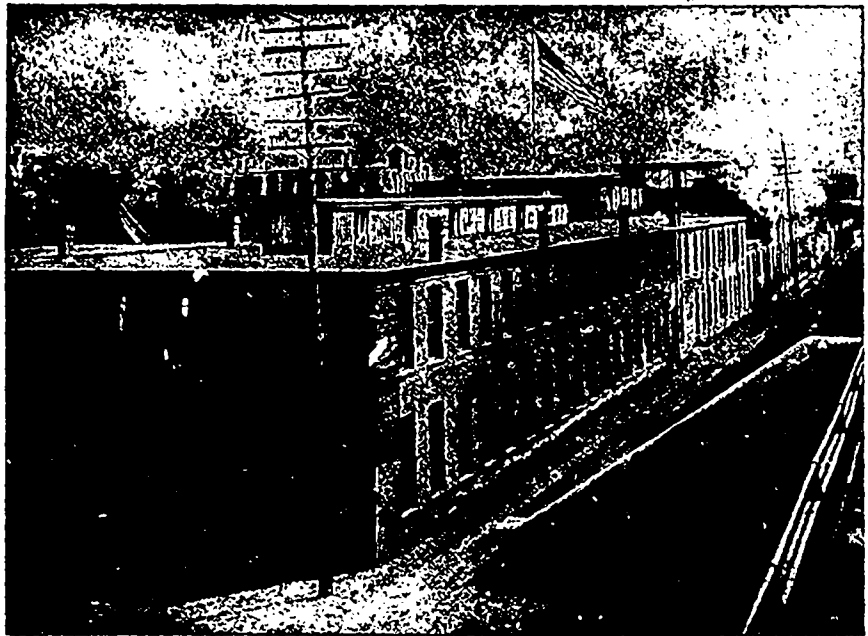
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its positive character, its ready adaptability, its independence of climatic conditions, and its instant response to any demand for increased steam supply, the account stands decidedly to its credit. Therefore any further saving, as, for instance, in the cost of the fuel burned, is clear gain over and above any expenditure that may have been made on account of the introduction of this method. Under ordinary conditions the steaming

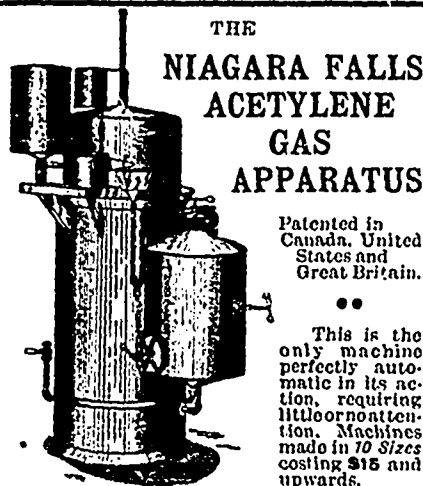


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This amount would, under conditions of the best economy, be practically sufficient to cover the cost of operating the mechanical draught apparatus, provided no attempt was made to utilize the exhaust steam, and would far more than cover it were this steam usefully employed. When to the economical advantages already pointed out is added the increased convenience of mechanical draught,

capacity of boilers may be greatly increased by the application of mechanical draught. This is equivalent to a reduction in the number of boilers required to secure the same capacity.

As a further factor in the matter of cost it should be noted that the fan possesses a definite advantage over the chimney in that it is portable, and is always a valuable asset.



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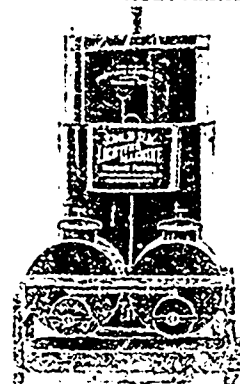
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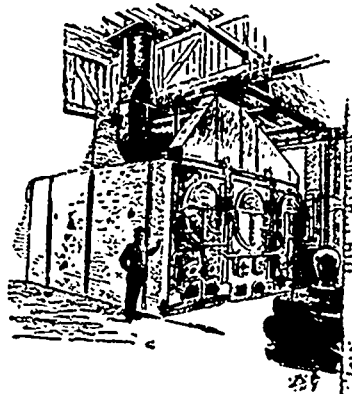
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The chimney, on the other hand, is a fixture; it is suited only to certain conditions, and is practically valueless unless those conditions exist.

The largest and most important factor in the operating expense is the cost of the fuel itself, which should be measured, not by the number of pounds, but by the available heat units obtained for a given price. In this cost are properly included the transportation charges, the expense of getting the coal into the boiler house and putting it into the furnace, as well as taking out and carrying away the ash.

The ability to utilize cheap fuels is an inherent advantage of mechanical draught, due to the fact that such fuels, being, as a rule, finally divided, with a large percentage of dirt and ash, require an intense draught for their combustion.

In addition to the economic advantages of mechanical draught which have been presented, there are others which relate primarily to the convenience of installation and operation. Prominent among these is the feature of adaptability. The fan, which is usually of steel plate, may be constructed in any shape to meet specific requirements, may be located as desired with regard to the position of the boilers, and, without expensive foundations, may be used for either forced or induced draught, and, because of its portability, may be re-located or exchanged



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Briefly summarized, mechanical draught has here been shown to be capable of reducing the avoidable losses, of decreasing the first cost of a steam generating plant, and of reducing the fuel expense. In addition, it presents certain marked conveniences in the matter of installation and operation. In these days, when every step in the process of steam generating and utilization is being scrutinized in the attempt to reduce the cost by even a single per cent., the opportunity presented by the employment of mechanical draught cannot be and is not overlooked.

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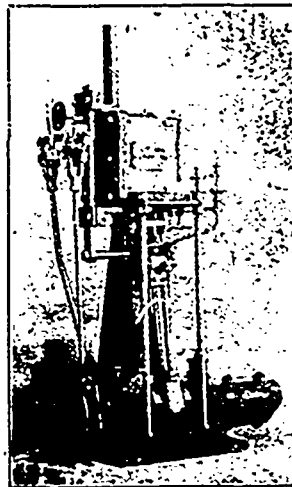
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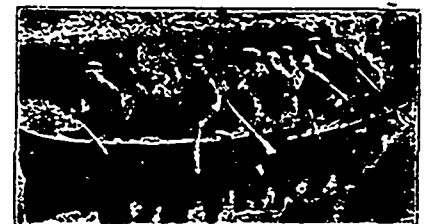
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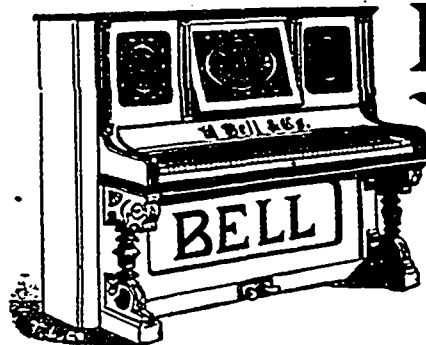
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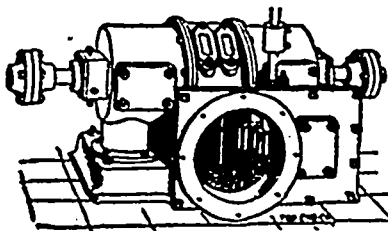
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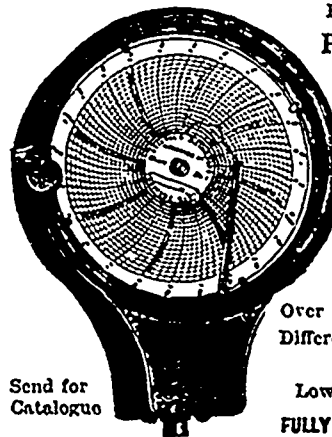
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