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The Canadian Engineer

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Readers of THE CANADIAN ENGINEER will not need much by way of an explanation of our mission. Most people connected with the trades we represent have seen one or more of the instructive engineering journals published in England and the United States, and a great many of these excellent papers are read in Canada. Valuable as these journals are, they lack the element of Canadian news, and of information bearing upon the special needs and circumstances of the country. These deficiencies it will be the aim of THE CANADIAN ENGINEER to supply, and we are glad to say that our aim has had the warm appreciation and sympathy of the great majority of those upon whom our agents have called in the preliminary canvass.

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Those to whom we have shown the title page and form of the paper have been pleased, and express their admiration of its appearance, and we confidently anticipate a generous welcome from our readers, and a friendly greeting from our contemporaries.

At all events it shall be our study to deserve well, and if by the kindly interest and co-operation of our

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We wish to put in a word for our advertisers. We have solicited only the best firms as advertisers, and we believe every firm represented in these pages bears an honorable name in business. We hope to have it to say that no reader of THE CANADIAN ENGINEER has ever been cheated by one of our advertisers; and, even at the risk of losing some revenue, we shall seek only reputable firms as patrons. Having started with this intention, and trusting always to be able to maintain it, we trust our readers will freely correspond with advertisers, not forgetting, by the way, to mention THE CANADIAN ENGINEER as the medium.

THE cry of tariff reform seems to be borne on every passing breeze in Canada just now, and it is plain that if the party in power do not do something to level down the mountains and fill up the valleys of our incongruous Customs, the party that is out of power will be called in to do it. The mission of THE CANADIAN ENGINEER is not political, but purely industrial. If it touches on the political aspect of industrial questions it will only be for the purpose of casting back upon the tide of fair competition those industries which have become inflated by extravagant duties into mere monopolistic schemes; or, on the other hand, of defending and supporting those manufacturers who, because they command no votes or have no "pull" with the Government, are left with but a nominal protection, or else actually handicapped in their relation to the hand-fed industries that have the pull. In other words we speak for fair play all round, which does not exist now; but, as the Government has promised to make a general readjustment, and is gathering information with that in view, it may, perhaps, be well to wait and see what will be done. Meantime, we may point out that as the day of wooden ship building is closing, and that of iron ship building opening, no industry stands in more need of reasonable encouragement. Canada led the world in wooden ship building in years past; there is no reason why, with our splendid maritime position, and the abundance of coal and iron in our sea coast provinces, we should not gain equal fame in iron ship building in future years.

THE Quebec Mining Association held a meeting on the 12th inst., with a view to framing a list of the various mining machines which should be entitled to free admission into Canada under the special exemption granted by the Dominion Government. It is to be hoped the Government will not accept the dictum of the Mining Association without consulting the interests of the manufacturers of machinery in Canada. We are aware of instances where some mining men, when this question was being agitated a few months ago, demanded that because a power pump of a particular firm's make was not manufactured in Canada, therefore

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it was entitled to free entry. When these exemptions were granted a couple of years ago it was distinctly stated by Mr. Bowell that the exemptions applied to classes or kinds of machinery that were not yet produced in Canada. But the contention that because Smith's pump is not made here, therefore Smith's pumps should come in duty free, though Canadian pumps serve the same purpose, is a self-evident absurdity, and the mining men will weaken their cause by attempting to include too much in their exemption list.

THE annual convention of stationary engineers to be held in Montreal this autumn will be one of more than usual interest, and we are glad to learn that the city council has granted a sum of money towards entertaining the members, besides giving the use of the city council chambers for the convention meetings. The attendance from distant points will be large if the railways make generous terms for the trip.

ENQUIRIES have been made within the past few days by capitalists, one representing a company in Montreal and one from the Maritime Provinces, as to the conditions on which smelting works may be established in Toronto. For the information of these and others it may be mentioned that the city propose to give to any company starting a smelter a site 100 acres in extent on the Ashbridge Bay marsh, with a bonus of \$75,000 and exemption from taxes for a period, provided the company expend in the proposed works \$400,000, which was their estimated cost. It is proposed to draw the ore from the Southern States, and use the ore of the Marmoras, Ont., mines as a mixing ore; but Mr. Geo. E. Drummond, of the Canada Iron Furnace Co., points out that this would be a mistake from an economical, as well as a patriotic standpoint, as the labor of mining and the money that would pay for the ore would go to the United States.

A FRESH break, discovered this month, in the Toronto waterworks conduit pipe, outside the bay, has re-opened the subject of a pure water supply for Toronto. The people of the city are tired of the time-enough policy shown in dealing with a question which may truly be called one of life and death. Within the past few days no less than four companies have offered to supply the city with ample pure water, and give apparently good guarantees for the performance of the work. The good name and character of Toronto depends upon the early and thorough solution of this matter, and a picayune or temporizing policy will work incalculable damage to the reputation of the city.

COL. TISDALE'S scheme for cutting a canal from Lake St. Clair to Lake Erie, though received with indifference in the House of Commons last session, is not without its friends. Conway Wyatt, an English engineer, now resident in Minneapolis, is prepared to build the canal and has friends who will invest in it. The cost would be about \$4,000,000, the canal—which would run through Kent and Lambton—being 13 miles long and having a depth of 21 feet. Mr. Wyatt has been to see Col. Tisdale within the last few days, and is prepared to start work as soon as a Dominion charter is given.

It used to be said that the only substance capable of cutting diamonds was a diamond itself. Now, however, a purely artificial material has been manufactured which does the work equally well. It is called carborundum, and is the result of the passage of a current of electricity through an intimate mixture of sand and

carbon. The silicon combines with a portion of the carbon, forming a porous, cinder-like mass of crystals; and these, after being separated, one from the other, by means of crushing, are sorted out according to size. So far as we know, carborundum has only been used in the cutting and polishing of diamonds, but doubtlessly as time goes on other uses will be found for it as well.

A HIGH-SPEED locomotive has been sent from England to the World's Fair, the driving-wheels of which are seven feet, six inches in height. It was built for private use, and is said to have covered ninety miles an hour. There are four cylinders on the front of the engine, and the driving-rods are so arranged that each driving-wheel is connected with a different cylinder.

It is pleasing to know that some Canadian manufacturers have, in the course of recent years, not only gained supremacy in the home market, but have been able to ship to foreign countries in the face of the competition of the world. An instance of this is afforded by Samuel Rogers & Co., proprietors of the Queen City Oil Works, who four years ago sent a trial shipment of their oils to Australia. The quality of their goods was so well appreciated in the antipodes that a steady demand arose, not only in Australia, but in New Zealand, until now the amount of this firm's export of oils there amounts to several thousand dollars annually. The Australians appear to have found that the Canadian oils are not affected by the change of climate to the extent other oils are, and do not get thin by reason of the heat.

A STILL more conspicuous instance of the march of Canadian industries has been brought to our notice from Newfoundland. Tenders were recently invited there by R. G. Reid, the well-known contractor, for the bridge work of the new railway running from St. John's to Hall's Bay. From twenty to twenty-five streams had to be bridged over with iron bridges, and the contract has fallen into the hands of the Dominion Bridge Co. of Montreal, though tenders had been received from England, Belgium, and other countries. The Dominion Bridge Co., who erected the celebrated C. P. R. bridge over the St. Lawrence, have begun the work, and will have all these bridges erected during the present summer, replacing the temporary wooden structures. It may also be mentioned that another Canadian firm, the Crossen Car Works, were successful in obtaining the contract for the passenger cars for the same railway. It is pleasing to note these things, not merely as evidences of Canadian enterprise, but as tokens of the growing intimacy of commercial relations between the Dominion and her insular neighbor.

SIR OLIVER MOWAT has assured a deputation of locomotive engineers from the railway corporations that the legislation threatened by a member of the Ontario Parliament last year with a view to compelling engineers to take out a government license, will not be acted on, as such matters may be dealt with by the Dominion Parliament only.

DELALOE & PIAT, of Paris, have made a machine for riveting by electricity, which is fully described in a recent number of the *London Engineer*. The piston is moved forward in a horizontal direction by the action of the electric motor working through speed-reducing gear, and compresses oil on the upper surface of the ram up to 300 kilograms per square centimeter—two tons per square inch. The ram, which acts vertically, has an area of 16 square inches, and therefore the

pressure of the rivet punch amounts to 32 tons. To effect this, the motor takes 25 ampères at 110 volts, or about $\frac{3}{4}$ electrical horse-power, for a period of two or three seconds at each rivet. The motor is a multipolar machine, having eight poles on each side of the armature and two carbon brushes placed at 45 degrees apart. The switch is arranged so that the lever in the furthest position cuts off the current after the piston has developed sufficient momentum. In this position also a brake can be applied to the fly-wheel to suit the requirements of the work. In bringing the lever back to the intermediate position a spring carries it clear of the starting contact and places it in the position ready for reversing. On reversing the motor the piston is carried back ready for the next rivet. The rivet punch is raised in the present machine by a hand crank, but it is intended to perform this by the action of the motor on reversing. In France and Germany these riveters have been used successfully and economically, and patents have also been granted in England.

DURING the last twenty years there has been a great increase in the consumption of coal. In Europe, the amount burned during the decade ending with 1890 was 62,000,000 tons greater than during the one previous. It is estimated that the annual output of coal for the entire world closely approaches 500,000,000 tons, the chief consumers of which are: America 141,000,000 tons, Great Britain and Ireland 128,000,000 tons, Germany 90,000,000 tons, and France 280,000,000 tons. Of course the supply cannot last for ever, and there have been many attempts to calculate just when coal will be a rare commodity. Each year the amount used increases, and thus constant increase seems to be taking place in an ever-growing ratio. A Royal Commission have estimated that in Great Britain about 146,773,000,000 tons are available at depths not exceeding 4,000 feet; and we note that another statistician declares that this supply will require less than 300 years to exhaust it.

THE French marine department recommends tar smoke painting as a preservative of iron work. The best way of taking care of tubular boilers when out of use is to fill them completely with water to which an alkaline reaction has been imparted by the addition of a small quantity of lime or soda. The external parts of the boiler, where accessible, should be painted with either red lead or coal tar; while those parts which a brush cannot reach may be preserved by burning coal tar under them. The smoke of the burning tar condenses in the cold tubes, and there forms a protecting layer which prevents corrosion.

ALEXANDER SIEMENS has constructed a new kind of electrical furnace for the equable heating of iron rods. It consists of a large, hollow core of carbon, which is rendered incandescent by the passage of an electric current. If an iron rod is passed slowly through this it becomes red hot at once, the heat being regulated by the speed with which it is pulled through. This furnace proves valuable also for tempering springs, and, with some modifications, may be used for heating rivets.

IN connection with the damage to the bridge at Upper Woodstock, N.B., Albert Brewer, its builder, finds fault with its plans and specifications, and says that the piers were not adapted to that form of bridge at all. The piers should have a peaked cutwater, and the water should have a decline of a foot and a half in depth, instead of the abrupt cutwater provided by the

plans. It is stated that when the ice breaks and the logs come down, they are carried from the Woodstock side with great force, not against the face of the cutwater of the pier, but against the side, which, according to specifications, is only about 14 or 15 feet wide. Against this great pressure it is hardly possible for the stone or iron not to give way. It appears strange that the specifications of a bridge should provide a cutwater for a pier in a place where it is unexposed, and yet allow no protection for a spot which has to bear the full force of running ice and a strong current.

FROM some experiments that have been recently made in Germany, it seems that by continued exposure to the air, coal suffers a material loss. It is said that ordinary bituminous coal depreciates nearly one-third in weight, and nearly one-half in gas-making function after long exposure to the weather. This depreciation is supposed to arise from a slow process of oxidation which probably takes place, thus causing the practical burning of a portion of the coal, and a lessening of its heating capacity.

OSMIUM is the most infusible metal known. Even in the intense heat of the electric arc, hardly a trace of fusion can be discerned. In alloy with iridium it is a very good material for the tips of gold pens.

IN France a vessel is being made of aluminium. Her hull will weigh 2,500 kilos, whereas, if built of the ordinary material, it would weigh 4,500 kilos.

A NEW kind of wire for telephone use, having an aluminium-bronze core with a copper-bronze envelope, is being experimented with in Germany. It is said to have a low resistance and great tensile strength.

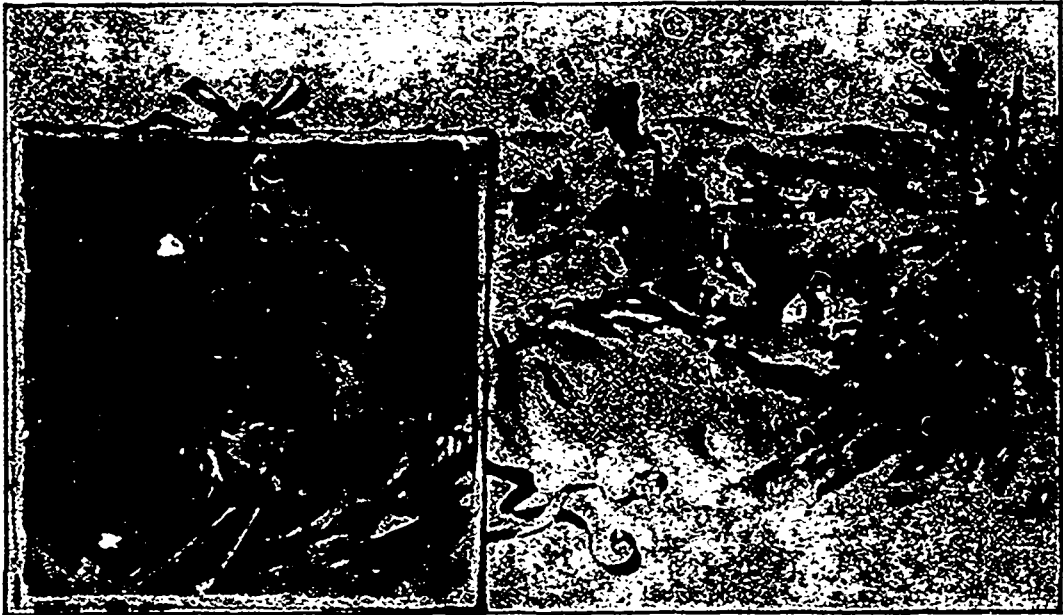
BOG ORES AND THE ANCIENT FORGES OF RADNOR.

THERE is not only a mine of metallic wealth, but a mine of literary and historical wealth, in the district of St. Maurice, where the ancient forges of Radnor are situated, and from which the celebrated bog ores of the province of Quebec have been taken from the time of Louis XIV., with various interruptions, down to the present day. At least 225 years ago, in the early days of the French regime, specimens of the bog ores of this region were examined and favorably reported on by Sieur la Pontardiere to the Government of France. Count Frontenac, in a letter dated Nov., 1672, described the situation, and mentioned that there were six piles of ore then lying at Cap de la Madelaine, which would suffice for two castings a day for four months, and the only question was where to place the forges which were to be brought out. The Jesuit Fathers already had a mill there, and he proposed to operate the forges by water power. It was not till 1737 that a blast furnace was erected by Cugnet & Cie, known as "La Compagnie des Forges," whom the French King, Louis XV., empowered to establish iron works, advancing them 100,000 livres without rent or taxes. This furnace was afterwards taken over by the Crown, skilled workmen being brought out from France and Sweden, and the historic furnace was operated from time to time down to 1883. In 1747 Prof. Kalm, of the Swedish Academy of Sciences, visited the works, and in the course of his account of them said: "Whilst my company was resting, I went on horseback to view the iron work. The country which I passed through was pretty high, sandy and generally pretty flat. I saw neither stones nor mountains here. The iron work, which is the only one in

this country, lies three miles to the west of Trois Rivières. Here are two great forges, besides two lesser ones to each of the great ones, and under the same roof with them. The bellows were made of wood, and everything else, as it is in Swedish forges. The melting ovens stand close to the forges, and are the same as ours. The ore is got two French miles and a-half from the iron works and is carried thither on sledges. It is a kind of moor-ore, which lies in veins within six inches or a foot from the surface of the ground. Each vein is from six to eighteen inches deep, and below is a white sand. The veins are surrounded with this sand on both sides, and covered on the top with a thin mould. The ore is pretty rich, and lies in loose lumps in the veins, of the size of two fists, though there are a few which are near eighteen inches thick. These lumps are full of holes which are full of ochre. The ore is so soft that it may be crushed betwixt the fingers. They make use of a gray limestone which is broken in the neighborhood for promoting the fusibility of the ore; to this purpose they likewise employ a clay marl, which is found near this place. Charcoals are to be had in great

fault on the bad state of population, and say that the few inhabitants in the country have enough to do with agriculture, and that it therefore costs great trouble and large sums to get a sufficient number of workmen. But, however plausible this may appear, yet it is surprising that the King should be a loser in the carrying on of this work, for the ore is easily broken, very near the iron work and very fusible."

From this date we pass on to the year 1860, when Larue & Co., after a very careful investigation, made with a view to locating the best point in the St. Maurice district for the erection of a blast furnace, etc., decided upon the site of the present Radnor Forges in the County of Champlain, thus strangely enough transferring the chief iron industry of the district of St. Maurice to the very site foreshadowed by Louis de Buade, Comte de Frontenac, as far back as 1672, as the most desirable location in all that country for the erection of a blast furnace. Larue & Co. carried out what, for that time, was a most elaborate plan, and established not only the blast furnace, but forges, rolling mills, and car wheel foundry (the latter located at Three Rivers).



VIEW OF OLD RADNOR FORGES.

abundance here, because all the country round this place is covered with woods, which have never been stirred. The charcoal from evergreen trees, that is from the fir kind, are best for the forge, but those of deciduous trees are best for the smelting oven. The iron which is here made is described to me as soft, pliable and tough, and is said to have the quality of not being attacked by rust so easily as other iron, and in this point there appears a great difference between the Spanish iron and this in ship-building. This iron work was first founded in 1737 by private persons, who afterwards ceded it to the King; they cast cannons and mortars here of different sizes, iron stoves which are in use all over Canada, kettles, etc., not to mention the bars which are made here. They have likewise tried to make steel, but cannot bring it to any great perfection, because they are unacquainted with the best manner of preparing it. Here are many officers and overseers, who have very good houses built on purpose for them. It is agreed on all hands that the revenues of the iron work do not pay the expenses, which the King must every year be at in maintaining it. They lay the

In addition to this they had 40,000 acres freehold lands. From 200 to 400 men were employed, and the works were carried on for some time with a product of 4 tons of pig iron per day. A pair of car wheels together with an axle manufactured at these works were sent by Larue & Co. to the International Exhibition of 1862, and attracted much attention, as the wheels had actually run 150,000 miles. Still better results have been obtained in later years from the same iron.

The wrought iron produced at the establishment was used largely for the manufacture of scythes and nail rod iron, and was much prized by consumers, who considered it equal if not superior to the very best Swedish iron.

In the establishment of the works over one million dollars was sunk, and the greater part of it was lost through disastrous fires, and, it is said, "bad management." There is no doubt, however, that the lack of railway facilities which prevented supplies being taken from a greater radius than seven miles, handicapped the proprietors in their attempt to find a market for the product, and had as much to do with the failure as any-

thing else. This disadvantage is now entirely overcome by the fact that the Canadian Pacific Railway connects the Radnor Forges, and shipment can be made by rail and water routes, the latter from the present Company's property and dock at Three Rivers.

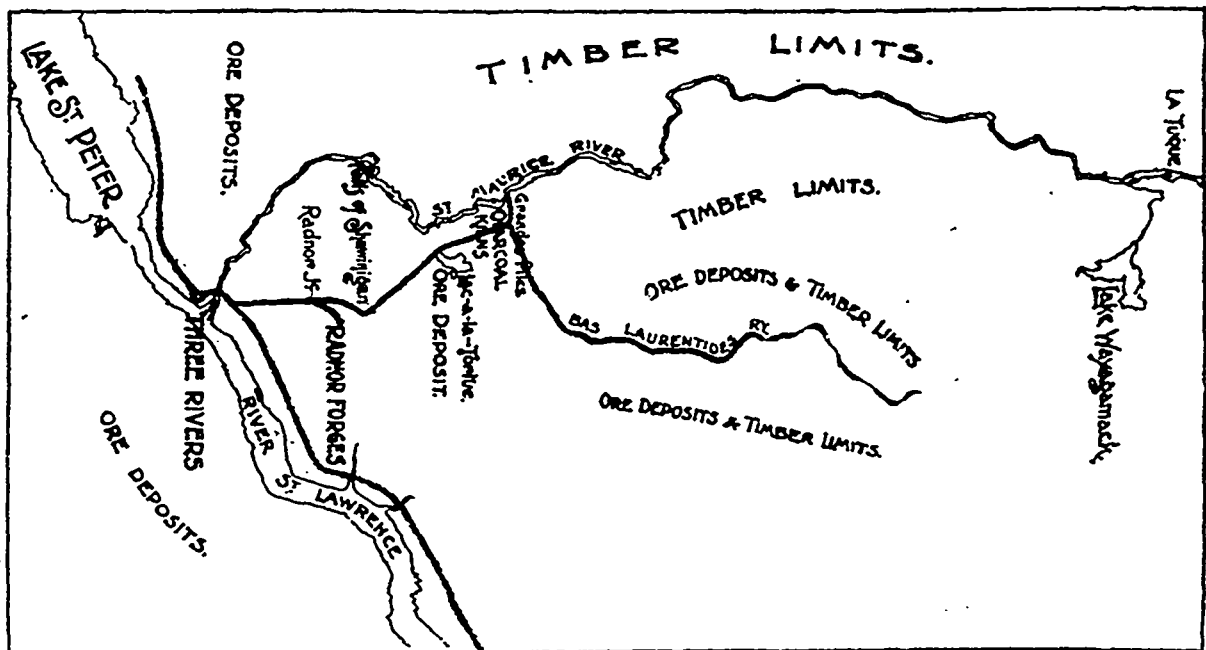
In 1889 the Canada Iron Furnace Company, limited, acquired Radnor Forges, together with the extensive property and interests belonging thereto. The president of the Company, P. H. Griffin, M.E., of Buffalo, gave an interesting account of their operations at the recent International Mining Convention held in Montreal. In this paper he gave the following account of tests they made:

"Some years ago we were induced to test in our car wheel shops at Lachine and St. Thomas a quantity of Canadian charcoal iron, the product of an antiquated stone stack situated at the village of Fermont, or Radnor Forges, Champlain, Que. We were told that this iron was made from the bog and lake ores of Three Rivers' district, celebrated in the history of the Can-

some idea of the strength shown in these tests we give the following result of the experiments made by us:—

"The basis of strength on first-class standard car wheel mixtures is expressed by a strength of 50,000 pounds per square inch traverse strength, obtained from a bar 1 in. x 12 in., the bar being supported on the extreme ends. By the introduction of 33% of Three Rivers' iron into our car wheel mixtures we were able to secure a strength of 65,000 pounds without difficulty. It was impossible, however, to procure any considerable or regular supply of the iron, the capacity of the old Radnor furnace being very limited, and its operation irregular."

They did not at that time think it possible to develop the manufacture of any great quantity of this special kind of iron, but it was evident that a considerable quantity, say 3,000 to 5,000 tons, could be made annually with every prospect of the maintenance of this product for many years. Later work developed the fact that this particular iron can be made in very much larger



MAP OF ST. MAURICE DISTRICT.

adian iron industry, and that it had peculiar merits in strengthening mixtures for car wheels and other high class castings. At that time we were using largely 'Selected Salisbury' charcoal iron imported at a very heavy cost from the United States. We were loath to make any change in our mixtures, as we had always pursued a most conservative course in the selection of iron entering into our wheels, but we finally decided to enter upon a series of careful tests with Three Rivers Canadian iron. Several trials proved that it was an iron of undoubted merit, which if the ore and wood supplies of the district warranted, could and should be made in large quantities, not alone to the advantage of the parties operating the furnace, but to the advantage of every consumer of iron in Canada who required castings of special quality, and certainly to the great gain of the Province and Dominion. We found the iron soft, tough, clean, close in texture, and with fine chilling qualities—the higher grades admirably adapted for the manufacture of chilled car wheels, the medium grades for castings requiring great strength, and the lower grades soft enough for the finest stove work. To give

quantities, probably sufficient for any demand that may be made, and the company after looking about them bought up large tracts of these bog lands. They are now operating on a large scale and they will increase their output.

Regarding the origin of bog iron, Mr. Griffin says: "Beds of hard bog ore are invariably found on hill sides above which swamps or marshes exist, or in runs which lead to or from these swamps. Wherever this dark swamp water flows sluggishly, and especially where swamp moss, fine grass or decayed vegetable matter exists, it will gradually form a light film with every appearance of that caused by oil, which gradually becomes thicker and sinks to the bottom in some quiet spot, where it takes a yellowish and slightly rusty tinge. This gradually becomes thicker, and when the water becomes lower in the dry summer, it becomes denser and either sinks lower to the firmer beds below the grass, or hardens and becomes bog ore. One very large deposit of soft ore entirely filled a deep ravine leading from an immense swamp. This ravine was being drained with a view of removing the ore for the

purpose of making metallic paint. To all appearance it was simply a dark muck, yet contained, on analysis, over 45 per cent. of oxide of iron. As the top became dry it caked and broke, the top crust showing as clean, black and brilliant a fracture as the best hard bog ore. This proved that the immense beds of soft ore—known as paint ore—known to exist throughout our swamps, will, when drained from natural or artificial causes, become more perfect, dry up and take the form of hard bog ore beds. Some beds of ore, when the top layer was removed, exposed a heavy bed of soft ore beneath. This being uncovered and exposed to the action of the sun for a time, became so hard that it required heavy work with a pick to remove it. In the particular section alluded to, many of the beds are soft on top and harder beneath, while others are the reverse. This would plainly indicate that in midsummer the water in the small swamps becomes so low that the ore deposited in the run-ways and during high water when the swamps overflow, had time to harden. In some, apparently, the water when again high, overflowed the old hard ore and deposited more ore on top, while in others it found an exit by oozing out beneath and leaving an additional deposit below.

"Bog ore, as a rule, is found twelve to eighteen inches below the surface. This season, however, the Canada Iron Furnace Co. are getting ore at a depth of four feet six inches, and the beds are heavy, thick and good, apparently of old formation. Ore has been raised from a depth of eight feet in the 'Grand Pile,' and although this immense swamp is covered with a soft, floating top, pockets of small sized ore have been found in paying quantities on the surface. These facts, taken in connection with the deposits of so-called paint ore in this swamp, may lead to the discovery of large bodies of ore in the bottom. Excavations to a depth of ten, twelve and fifteen feet, in the immediate vicinity of Radnor, show as strong indications of ore at the bottom as at the top.

"Apart from the bog and lake ore deposits, vast mines of Titanic iron are known to exist in the Laurentian range of mountains, and elsewhere in the Province of Quebec. At the present time these ores cannot be utilized profitably, but science will sooner or later find a means of using these titaniferous ores, not alone with economy, but with great benefit to the metal into which they enter."

A. P. Lowe, of the Geological Survey, gives more interesting information about these iron regions, and thus speaks of the Lac-a-la-Tortue, which is situated in the southern part of Radnor, about two miles from the St. Maurice River: "The lake is about three miles long from north-east to south-west, and has an average breadth of about one mile. It occupies the lowest depression of a great swamp called Grand Pile, that extends north and south from the lake. At its centre the water is under twenty feet deep, and shoals gradually to the shore. By removing an obstruction at the discharge the water has been lowered some six or eight feet, and a wide margin of its bed has been exposed on all sides. The lake is fed by a number of small streams flowing from the surrounding swamp; these are highly charged with salts of iron, giving the water of the lake a very ferruginous taste, and coloring it a rusty yellow. The ore is found in the form of concretions scattered through the soft greenish mud, for several feet below the surface of the bottom. It appears to be formed by the precipitation of the protosalts in solution, which take up oxygen from the surface, and, becoming in-

soluble, sink to the bottom, where they collect about various particles of foreign matter and form flat, porous concretions of various sizes, the largest being often six or eight inches in diameter, by over an inch in thickness, and show distinct rings of growth. The growth of the ore in the lake bottom is quite rapid, it having been found that paying quantities of ore can be obtained from areas completely exhausted some eight or ten years ago.

"Work is carried on by hand in the shallow portions along shore, and in the areas left bare by the lowering of the level of the water. The operation consists in shovelling the mud containing the ore into iron sieves of about thirty inches in diameter, where the ore is washed free from mud and then made into convenient heaps for removal. In the deeper parts of the lake the ore is raised by a dredge with three rows of iron buckets on an endless chain. The dredge is capable of working to a depth of twelve feet, and brings up the ore mixed with soft mud; this is dumped into a long cylindrical sieve, placed on an incline so as to discharge on to scows moored alongside."

We hope one day to give some account of the legends and stories of this interesting region which have been gathered by Mr. W. H. Drummond, the clever author of French Canadian dialect verses, such as the "Wreck of the Julie Plante," and the "Papineau Gun," familiar to many of our readers.

THE MINERALS OF NOVA SCOTIA.

The following items are selected from the report of the department of mines in Nova Scotia, from which it will be seen that in the output of some of the most important minerals, there has been a considerable falling off:

	1891	1892
Gold, ounces.....	23,391	19,998
Iron ore tons ..	57,391	75,000
Manganese ore " ..	41	111
Coal raised " ..	2,044,784	1,942,780
Antimony ore " ..	10	
Copper ore " ..	900	26
Lead ore " ..		1

Mr. Murray, in submitting this report, stated that enlarged markets were required for both iron and coal. If duty on iron exported to the United States were removed, he thought a larger export might be looked for.

CANADIAN IMPORTS IN METALS.

From the following comparative table may be seen the values in pounds sterling of the exports in iron, etc., from Great Britain to Canada.

	March		Three months ended March.	
	1892.	1891.	1892.	1891.
Hardware and cutlery	£10,334	£8,281	£21,990	£19,135
Iron, &c.—				
Pig iron	1,906	1,802	2,938	4,100
Bar, &c	4,257	2,420	8,420	4,995
Railroad	1,070	1,648	5,350	11,620
Hoops, sheets, &c....	1,992	975	4,812	4,526
Galvanised sheets....	1,973	3,313	5,508	5,059
Tin plates	15,259	7,388	46,381	24,449
Cast, wrought, &c., iron	6,092	7,075	15,702	15,445
Old (for reman'facture)	3,540	9,725	10,080	13,609
Steel.....	6,664	11,579	22,517	27,084
Lead.....	680	195	2,541	459
Tin, unwrought.....	2,802	1,033	7,148	1,665
Cement	374	457	1,317	1,814

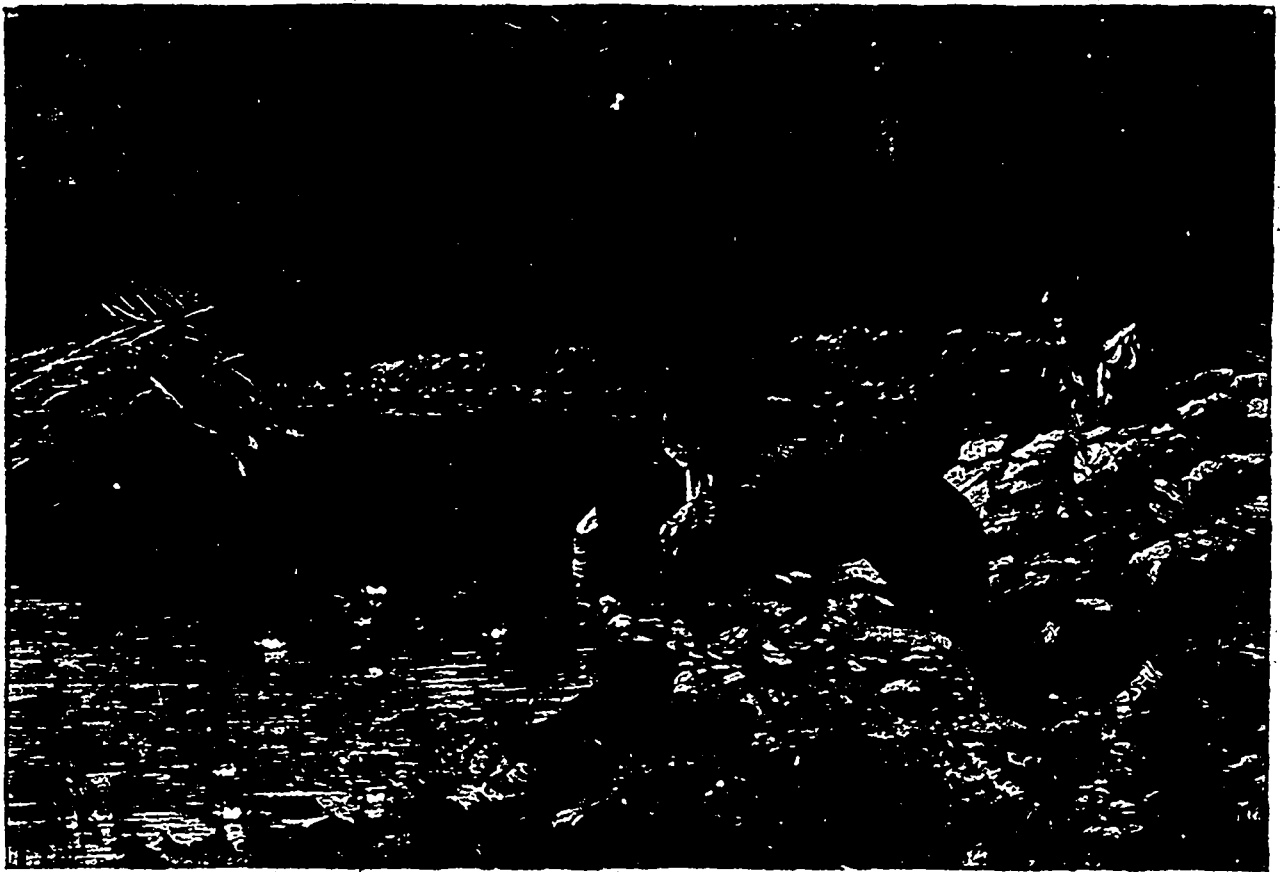
The chief increase has been in railroad iron, the imports of which this year have more than doubled those of the corresponding three months of 1892. This increase, however, was more than counterbalanced by the fall in tin (both unwrought and in plates) and lead, the decrease in which articles was very marked.

A CANADIAN ENGINEER.

THE first and original "Canadian Engineer" was the beaver, and the monuments he has left of his engineering skill are, in their way, as remarkable as the ruins of Karnac, or the pyramids of Egypt, or any other evidences we see of the constructive skill of early man.

In the minds of all who have the slightest interest in natural history, says the *Journal of Fabrics*, the Canadian beaver excites wonder and admiration. The manner in which he fells large forest trees, cuts their trunks in lengths, floats the heavy pieces down the stream, constructs his dams, builds his lodges and digs those wonderful beaver canals, raises his skill to the dignity of reason. The accompanying composite picture made from photographs taken by Horace Martin, of Montreal, for his recent book on the beaver, shows

position in these dams! There is a still greater mystery in the wonderful beaver canals. There is no animal in all creation like the beaver. The only creature that comes near him for intelligence is his great antipodes of India, the elephant, whose magnanimous character and enormous strength command our reverence, but when we note his bulk we expect great things of him as a matter of course. But the beaver achieves feats impossible to mere instinct, and no wonder Canadians glory in this plucky little animal, the incarnation, as it is, of industry, perseverance and constructive skill. With him as their national emblem they would prove ignoble indeed if they failed to do honor to their race and make their nation wise and great. What was the beaver placed in this special quarter of the world for if not to teach Canadians their mighty destiny?



THE FIRST AND ORIGINAL "CANADIAN ENGINEER"

in one view the tree-felling operation, the lodges and the dam. Of course there has been a great deal of exaggeration regarding the feats of the animal in many respects, especially as to the beauty of its lodges; but when all the cobwebs spun by imaginative writers are swept away, as Mr. Martin does in the interest of truth, the known work of the beaver still compels our admiration and excites our awe at the marvellous designs of Providence in animal creation. The object of the dam, for instance, is to secure a greater supply of water through the year; but to make it sufficiently strong and water tight to resist the effects of floods, to gauge the highest safe water-level, and to carry out the details of the work, these are marvels which are not even yet thoroughly understood. Some of the trees cut down by beavers have measured 18 inches through, and chip-pings cut out by their remarkable chisel teeth are nine inches long. What strength and adroitness must be required to handle timber of this size and get it into

TIGHTENERS.

Tightening pulleys should only be resorted to when absolutely necessary. A belt on which a tightener is in constant use is sure to wear out sooner than it otherwise would. Still, in some cases, to do without one would mean a re-arrangement of the whole series of belts, thus entailing expenditure of time and money. Where tighteners are really necessary is in instances where the belts are running on pulleys which differ considerably in size. If possible, they should be run near the smaller of the two pulleys, whether it be the driver or driven, so as to increase the lap of the belt on that pulley. When a great deal of difference exists between the diameters of the pulleys, there is an excess of lap on the large pulley and a deficiency on the small one. It is unnecessary, therefore, to work the tightener very hard against the belt. It is merely put on for the purpose of taking off the slack, and at the same time

forcing the belt further round on the face of the pulley. If by this means the arc of contact in the smaller pulley is made equal to that of the large one, the belt will adhere tenaciously to both, and will cease from slipping. In cases where both the pulleys are of about the same diameter, the arc of contact will be about the same, and the location of the tightener will make no practical difference. But it should always be on the slack fold of the belt.

MICA AND ITS INDUSTRIAL USES.

According to statistics quoted by B. T. A. Bell, at a meeting of the General Mining Association of Quebec, the value of the mica produced in Canada has, during the last few years, increased enormously, whilst that of the United States has been just as steadily diminishing. In 1892, the value of the mica exported from this country amounted to over \$100,000, of which the Ottawa district alone contributed nearly \$55,000 to United States.

The importance of this industry may be better judged by giving a list of some of the many uses to which this mineral has been applied.

Twelve years ago, it was almost wholly utilized by stove manufacturers for panelling the doors of stoves and furnaces. For this purpose, it had to be clear and uniform of color, and free from spots.

The chief factor in increasing the demand for mica has been its insulating power for electrical purposes. For armatures it is superior to any other substance known. The reasons for this are, primarily, its great hardness, which prevents its wearing away under the action of the brushes; the ease with which its structure may be divided into marvellously thin layers of uniform thickness, and the high temperature to which it may be subjected without being affected in even the slightest degree. For electrical machines it is essential that the mica be smooth, free from wrinkles and crevices, and it must be flexible and split readily. All these conditions are fulfilled by the Canadian, or, as it is called in the market, "amber" mica; indeed, on account of its superior cleavage, the Canadian article is preferred by electricians to any other. For insulating purposes, a mica cement, called *micaline*, has been invented, which obviates some of the objections arising from the difficulty of shaping mica itself into convenient shapes. It consists of a mixture of pulverized or comminuted mica with a liquid cement, which, while still soft, can be compressed into any form desired.

The imperviousness of mica renders it of peculiar value for the glasses or spectacles of workmen, especially those employed in metal working or in stone quarries. The spectacles may be beaten with a sledge hammer without danger of being broken; and even the pouring upon them of molten metal produces no effect. Another of its applications is to ornamental purposes. From its unalterable nature the material preserves gilding, silvering, or coloring from deterioration; and from its diaphanity, the articles so treated will preserve their full brilliancy for any length of time. It is also used in producing the beautiful bronze-like colors, known as brocades, crystal colors, or mica bronzes, which have the advantages of lightness in weight, brilliancy of tint, and of being indifferent to sulphurous vapors.

Mica is the basis, also, of what is known as mica-grease, which is so valuable as a preventive of friction in railroad cars, etc.

On board warships, too, or in localities where glass would be broken by the concussion due to the firing of explosives, or in making reflectors and sea-compasses, it has been used successfully in place of the common material.

Besides these various uses, it is employed for roofing purposes, and forms the basis of several inventions of water-proof and fire-proof coverings for strata of felt, rubber, tar, canvas, and other materials.

SOME GOVERNMENT CONTRACT WORK.

Among the estimates of the Dominion Government for the next twelve months, we note the following:

Sault Ste. Marie Canal—construction.....	\$2,067,000
Lachine Canal—repairs, &c.....	17,800
Chambly Canal	7,720
St. John, N. B., Custom House	100,000
Toronto Drill Hall.....	143,000
Victoria, B. C., Drill Hall.....	26,500
Halifax, N. S., Quarantine Wharf, &c	37,500
Grosse Isle, Que., Quarantine Station	50,656
William's Head, B. C., Quarantine Station.	97,000
Chatham, N. B., Post Office, Custom	
House, &c.....	15,000
St. Vincent de Paul, Que., Penitentiary....	32,000
Quebec Post Office	10,000
Smith's Falls, Ont., Post Office, Custom	
House, &c.....	18,500
Winnipeg Military Buildings	20,000
Regina, N. W. T., Court House, &c.....	20,000
Calgary, N. W. T., Post Office, Custom	
House, Dominion Lands and Crown	
Timber Office, &c	25,000
Northwest Mounted Police Buildings	20,000
Digby, N. S., pier	19,000
Bayfield, N. S., Wharf	19,000
Shediac, N. B., Breakwater	30,000
Toronto Harbor	75,000
Fraser River, B. C., improvement of channel	
New Dredging Plant	30,000
Increased railway and canal accommoda-	
tion at Halifax, N. S	150,000
Soulanges, repairs to canal	1,000,000
Cornwall, do. do.	530,000
Rapide Plat, do. do.	275,000
Galops, do. do.	250,000
St. Lawrence River and canals	250,000
Purchase of a new steamer	50,000

METALLURGY.

The Industrial Association Committee on Metallurgical Industries has issued a report, from which it seems that Toronto could easily be made the chief nickel market in the world. We see copper carried past our doors to Europe, and re-imported (with a duty of 30 per cent.) in the same form that we could make ourselves. Should the processes of melting and refining metals be carried on at Toronto largely, the committee consider it desirable that the municipal council should set aside special districts for them, such as the unused shore of the Bay. The city might build a bridge across the Don and make the road, while the Harbor Commissioners would perhaps give directions for the dredging of approaches for vessels.

The committee declare that there ought to be in Toronto an establishment for treating ores containing precious metals. Perhaps an experimental plant could be erected in connection with the School of Technology, or perhaps it would be better for the Government to encourage by bonuses or fees a private industrial establishment. A good museum of Canadian ores would also be a great advantage. They think that the policy of the Government in respect to encouragement of the mining industries should be at once made known.

The heaviest marine boilers afloat are claimed to be those for the new Cunarders. Each weighs 110 tons, and each ship has a dozen of them.

HEAVY BUILT MILLING MACHINE.

WE illustrate in this number a 60-inch Milling Machine of heavy build, manufactured by JOHN BERTRAM & SONS, Canada Tool Works, Dundas, Ont. The bed is a hollow box casting which carries the table and box standard for cutting head. The table is operated by a rack through a powerful set of gears driven by the cone and worm shown in front side of

standard which carries the outer bearing of mandril can be moved back, or entirely removed to admit work that will not pass clear through between the standards. The frame is furnished with an oil tank and pump for supplying oil or other liquid to the cutters, which is returned to the tank by a channel round the table; by this arrangement the machine is kept clean and results in a considerable saving of oil. All the spindles are of steel and parts subject to wear are case-



JOHN BERTRAM & SONS' MILLING MACHINE FOR HEAVY WORK.

frame, and is provided with automatic stops. When the table is disengaged by the dropping of worm, it is quickly worked by hand wheel, and by this means little time is lost in setting the machine for a new cut. The head which carries the cutter spindle can be raised and lowered by the crank in front side. The spindle is driven by a powerful set of spiral, bevel, and spur gears, giving ample power for the heaviest work in locomotive and engine construction. The outside

hardened. The machine admits 22 inches between the standards; greatest distance from spindle to table, 19 inches; width of table 20 inches. The driving cone has three speeds for a 3-inch belt, and running at a high velocity gives ample power in heavy cutting. The weight of machine is 6,800 lbs.

THE latest idea in telephones is one that can be taken to any room at a moment's notice.

OIL-SAVING.

The principle seems to be coming into use of economising supplies in engine-driving by means of offering premiums on the amounts saved. In the case of fuel this may work very well, but we are not sure that in trying to economise with oil engine-owners do not risk a greater expenditure in other respects, owing to increase of friction and consequent loss of power. True, many enginemen are in the habit of pouring oil on the bearings as though it were as cheap as water; but it seems to us that this could easily be kept in check by means of a little supervision. At any rate, it is better for the machinery and for economy in coal that a little more, rather than a little less than enough oil, should be used. The best way to economise in the high-priced cylinder oils is to use a good sight-feeder, which will not only save in the amount of lubricant used, but will supply it just at the time it is most wanted.

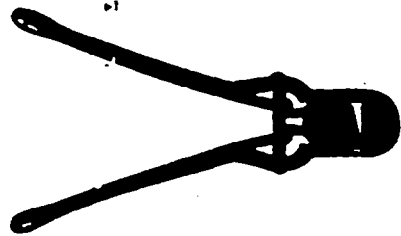
THE TREMENDOUS FORCES OF NATURE.

The force of gravitation is the force which keeps the earth and planets in their orbits, the invisible but potent cord which binds together the members of our system. We have heard the fact stated so often that it is an old story, and accept it without further thought. But consider for a moment, says Prof. A. J. Dubois, how great this force must be! A bar of steel one-quarter of an inch square can sustain a weight of about 7,500 pounds, or the weight of fifty full-grown men. Now, simply to hold the moon in its orbit, we should have to have a colossal bar of steel, stretching from the earth to the moon, whose section would be 87,500 square miles! An area which would cover the three Maritime Provinces and leave 36,700 square miles over. Or if, instead of one single bar, we should stretch a forest of steel bars, each bar one-quarter of an inch square, from the earth to the moon, we would have to cover the entire surface of the earth on the side toward the moon with such bars at intervals of only six inches. Think of it! A forest of steel whose stems would be so close together that a cat could scarcely squeeze through. This is what the "force of gravitation" means. Take another illustration of the mighty forces amidst which we live so securely and so unconsciously. The mean rainfall on the earth may be taken at, say, five feet; the mean height of fall at about 900 feet. We have, then, the average power of the rainfall per square mile, about 445 horse power. The work performed, then, by the sun's rays in simply raising our yearly rain supply, without which all life would perish utterly, is 87,630,000 horse power. In comparison with this the puny 20,000,000 steam power of man sinks into utter insignificance. This steam power is, however, only the utilization by man of the merest trifle of the sun's heat, stored away in past ages and bottled up for future use, in the shape of coal and wood. Such are some of the giant forces in the midst of which we live, forces so delicately balanced, so nicely adjusted, that such estimates strike one as incredible. And all these mighty forces to-day are going to waste on every hand! The direct rays of the sun, the rise and fall of the tides, electricity, magnetism, gravitation, these and many others—all strong servants—stand willing and waiting for the master who shall bend their vast energies to the service of humanity. Shall they always stand and idly wait? Is it too much to expect that,

the same persistent study of nature which has in the past achieved such wonders, and which has already subjugated one of nature's great forces, and in doing so ushered in the civilization of to-day, will yet conquer the others also, and thus achieve results compared to which all that has yet been done will seem insignificant? The great and beneficent forces of nature are but just beginning to be utilized and brought under control and direction. One only of these forces we have but very imperfectly captured. Heat alone has become our servant, but the giant wears his chains lightly, and sometimes breaks them in derision. Our foot is not yet upon his neck, and he works for us with but a single finger. It remains to secure the entire and hearty service of all his mighty strength, and to enlist with him his now idle yet equally powerful comrades in united efforts for the advancement and prosperity of mankind.

CATTLE DEHORNING KNIFE.

S. S. Kimball, Craig st., Montreal, is manufacturing a novelty in the small tool line. It is an improved cattle dehorning clipper. This little instrument, invented by Dr. H. W. Leavitt, clips the horn in less than a quarter of the time it takes to saw it; there is correspondingly less pain, and it never crushes. A clean, smooth cut is always made. The annexed diagram will explain how the clipper works.



In order to push the sliding knife with greater power, the swing levers are short fulcrumed. Being held in guide grooves, the knife cuts in a true plane and cannot be harmed by sudden movements of the animal under operation.

There can be no doubt, in spite of what some people call the cruelty of the process, that dehorning possesses many advantages. It is safe for the animals themselves, and it gives so much more room in case of shipment, etc. The Government commission have reported in favor of it, and from the number of dehorned cattle in existence at the present day it looks as if farmers in general are of the same opinion. The Improved Clipper made by Mr. Kimball certainly seems to be the one in the market which is best adapted to its purpose in every way.

VON SIEMENS, the celebrated engineer and electrician, and head of the Siemens & Halske Electric Co., is now in the States and is expected in Canada shortly, when he will look into the question of the transmission of electric power from Niagara Falls to Hamilton. A company was proposed to lay a cable from the Niagara Falls to Hamilton, supplying the city and suburbs with electricity for all purposes, but the practicability of the scheme is at least doubtful. An electrician of wide experience, who looked into this matter, informed the writer that in such a distance the dissipation of electrical power is too great, and the requisite size of cable too large, to make the scheme profitable to the promoters.

THE DIRECT ELECTRIC ELEVATOR.

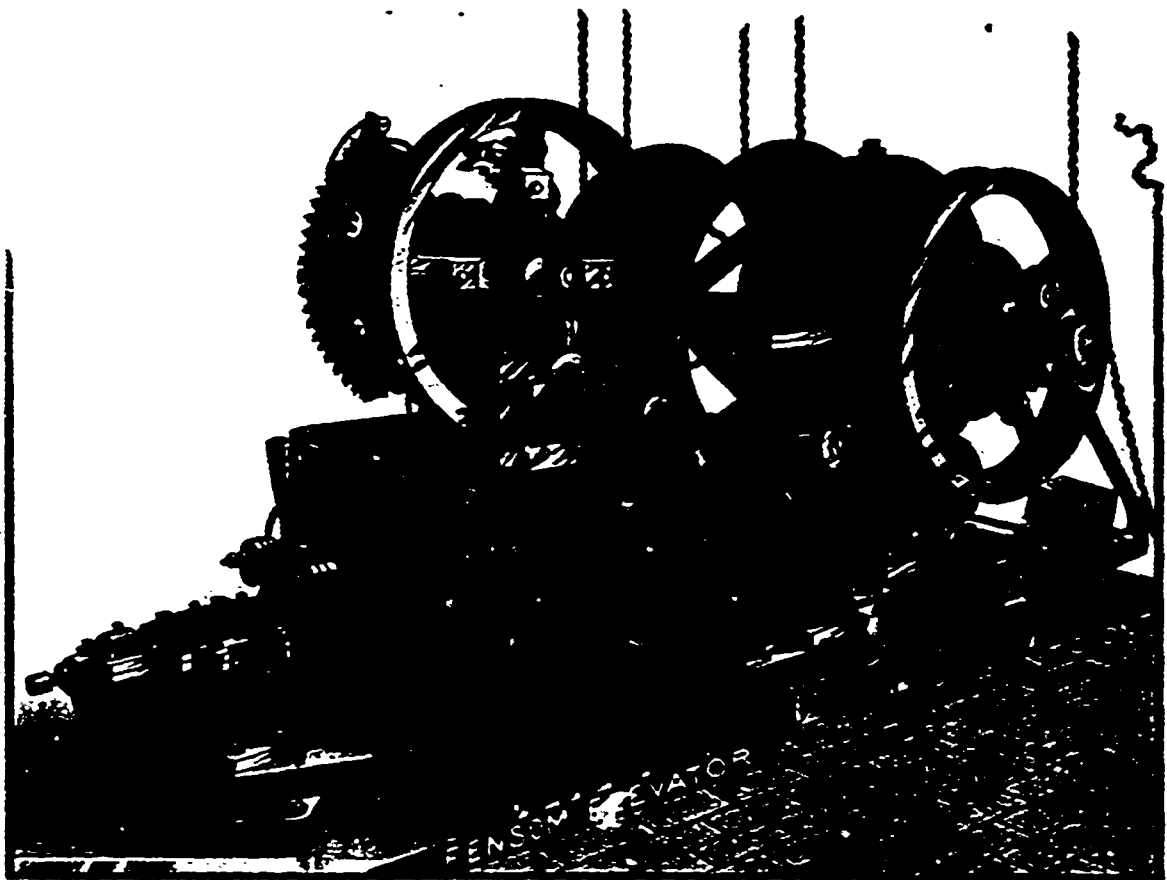
AS the manufacture of elevators has, of late years, become quite a large industry, it will no doubt be interesting to our readers to have presented to them a short description of the latest departure in this line, namely, the Direct Electric Elevator, and to learn that Canadian manufacturers, in this, as well as in other branches of this industry, are not one whit behind their thrifty neighbors on the other side of the line; and we can only regret that several firms here have overlooked this fact, and have purchased machines off American makers when identically the same article was to be had here, and at a considerably less cost.

In the manufacture of electric elevators great trouble has been experienced in contriving a controlling

In starting the elevator, the brake is gradually lifted, and at the same time the current is admitted to the fields, then, through heavy resistances, to the armature, which, as it revolves, gradually cuts out the resistance until it attains its full speed.

The reversing is effected by a simple switch mechanism, which operates automatically as the lever or the check-rope in the car is worked.

It is a strange fact that while paper is being used for dozens of purposes formerly monopolized by wood, or even a harder material, such as car wheels, boxes, barrels, tubs, pails, etc., wood is rapidly driving other ingredients to the wall in the manufacture of nearly all the cheaper grades of paper.



THE DIRECT ELECTRIC ELEVATOR.

device that would reverse, and stop and start the motor gradually, and so control the current that there would be no possibility of its burning out the armature. Another difficulty was that of producing gearing that would run perfectly smooth and noiselessly, so that no jar would be felt on the car.

The above cut, for which we are indebted to the FENSON ELEVATOR WORKS, Toronto, represents a complete set of electric elevator machinery, bolted to a stone foundation in the basement of a building, the ropes being guided by idler wheels to their proper positions in the elevator well.

In this machine worm gearing is used to give rotation to the drum, which is secured to the worm-wheel shaft. The armature shaft is coupled direct to the worm shaft. The coupling is used to serve, also, as a brake wheel. The brake is operated by cams in the controlling wheel simultaneously with the snap switch on the motor.

A MIXTURE of 7 ozs. of beef marrow and 3 ozs. of pines colcothar forms a capital polishing paste for metals.

ON the London and North-Western Railway of England, 18 tons of steels are said to disappear daily through wear and tear.

ANY person getting a copy of THE CANADIAN ENGINEER who does not intend to file or bind; will confer a favor on us if, after reading, they pass it on to some friend who may be interested in the subject.

CHICAGO, the city of great boasting, has a steel chimney 350 feet high. The steel varies in thickness from 5-32ds of an inch at the top to three-eighths of an inch at the bottom. The lower 75 feet are lined with eight inches of firebrick, and above this the lining is of hollow tile, supported at intervals of 25 feet by angle iron riveted to the steel shell. The foundation is made of steel rails and I-beams laid in cement.

A NEW alloy of silver, cadmium and zinc is being brought into use for silver-plating.

J. W. BOOKWALTER, the millionaire, has a model under way which he thinks will solve the flying-machine problem.

GREAT BRITAIN has 751 blast furnaces, of which nearly half are idle. The United States has 246, slightly less than last year.

COPPER plating sheet zinc for building purposes has been tried with considerable success, the zinc combining well with the copper.

A FOREIGN firm are manufacturing a machine to take the place of the lathe in various turning operations. It finishes at one cut any circular surface which can be produced by milling cutters.

THE smallest holes pierced by modern machinery are 1-1000 of an inch in diameter. They are bored through sapphires, rubies and diamonds by a machine which makes 22,000 revolutions per minute.

OVER \$1,000,000 will be paid by the Carnegie Steel Company for a 16,000-ton press for its armor plate works at Homestead. It is to be made in England, and will be in operation early in 1894. It will work a plate of 200 tons in one piece.

IN cases where excessive friction would disturb the physical nature of the metal in use, such as when iron surfaces tend to become welded together, the best preventive is a lubricant formed of a mixture of oil of mustard with a small quantity of petroleum, fish oil, or other such fatty substance.

EDWIN ROCHESTER, of Ottawa, is exhibiting at the World's Fair a new electric car fender invented by himself. It is attached to the front platform, of which it forms in fact a part, and consists of a series of fingers, which, when an obstruction is met, recede and form a cushion to receive the falling body. It is intended, of course, to save the lives and limbs of those who would be caught by a passing car and otherwise run over.

A DESCRIPTION of a new moulding machine for use in foundries has been held over till next issue owing to delay in the arrival of the cut's. This machine is the invention of Harris Tabor of New York, and is making quite a revolution in foundry work on the other side. An explanation of its working will appear next month, and meantime readers interested may obtain information from J. & H. Taylor, Craig street, Montreal, who have been appointed agents in Canada.

IT is suggested that the Ontario Government spend \$5,000 in making a survey of the region around Hudson's Bay, in order to settle the question as to whether it is possible to obtain there a good and lasting supply of coal. The discovery of coal would give a great impetus to navigation in those waters, and would materially assist in the development of mining for other minerals which are known to exist in the northern and hitherto unexplored regions of Ontario.

THE mineral exports of Newfoundland during 1891 were as follows:—Copper ore, 7,060 tons, value \$63,540; regulus, 3,626 tons, and ingots 1,139 tons, value of both \$502,510; iron pyrites, 19,150 tons, value \$57,900; antimony, \$1,000. The total value of ores exported in 1891 was \$624,750. From 1854 to 1891 the total value of copper ore exported was \$9,173,790; the total value of all ores exported in that period being \$9,594,717. There is likely to be a development in the asbestos mining of the island this year.

ONE of the most novel and interesting exhibits of German manufactures will be the mechanical apparatus exhibited by the Chemnitz machinist, Max Kohl. He will show a galvanometer and a steam engine which are of such small dimensions that the whole mechanism can be placed in a nutshell. This delicate mechanism will be in complete working order, and it will be encased in a glass tower so constructed that the entire apparatus can be seen. The only question the writer of this does not enlighten us on is the kind of nut by which its size is measured. Is it a cocoanut?

ACCORDING to the *Macleod Gazette*, one reason against irrigation by private companies in the Canadian North-West is that in many districts they would have to include in their irrigating work lands belonging to large corporations, such as the Dominion Government, railroad companies, etc. By so doing, they would increase the value of such lands enormously, but without receiving any return whatever for their outlay. This objection could be overcome by legislation, such as by levying upon lands whose value has been increased by this means, a fair proportion of the costs.

PEOPLE were a good deal surprised to hear that the Edison Electric Light Co. had failed to obtain an injunction against the Columbian Incandescent Lamp Co. to restrain them from making the lamps. On previous occasions they had succeeded in restraining some six or seven light companies. Now, however, they have received a check on the ground that the real inventor of the incandescent lamp was Henry Goebel, of New York. In the meanwhile, until the case comes before the Supreme Court of the United States, the Columbia company can continue the manufacture, having given a bond of \$20,000.

IN a Pullman car, there is a ton of inanimate matter lugged along for every passenger who rides upon it, and the first important step toward rapid transit lies in dispensing with this cumbersome mass of dead weight. Supposing a car were to be shaped like a cigar, and constructed merely of hoops of steel, covered with wood or some light metal; we can easily see what an enormous amount of energy would be saved on the double account of lightness, and of less atmospheric resistance. If we, in addition to this, suppose the car to be sustained by two perfectly smooth elevated rails, and to run on oiled gearing scientifically accurate in every detail, it is not difficult to imagine a train rushing safely through space at the rate of say 150 miles an hour. Such, at least, is the opinion of J. M. Case, who discusses "Rapid Transit" in the *Mechanical News*.

IT appears likely that Hamilton will get the smelting works that have been coveted by several Ontario cities. At a conference held in that city on the 8th inst., between members of the City Council and Moorehouse & Reynolds, of New York, an agreement was drawn up and signed by which the New York men will expend \$400,000 in erecting smelting works, if the city grant them a site to cost \$40,000, on completion of the works. If steel works are established later at an additional expenditure of \$400,000, the city will grant an additional \$600,000 bonus. The city will apply to the Legislature for power to grant the bonus, and a by-law will be submitted to the people immediately thereafter. Hamilton has made the iron industry its specialty, and none will envy it if by the acquisition of this important business its progress in this special line is further accelerated.

THE first electric railway locomotive is to be running this month at Lynn, near Boston. This experiment is being made by the Boston and Maine road on their Crescent Beach branch. It will be a trolley line.

AN electrical insulating material, which is said to be very successful, is composed of one part Greek pitch and two parts by weight of burnt plaster. When hot the mixture forms a paste which can be cast in moulds.

A good polishing soap may be made by mixing 100 parts of coconut oil soap (with sufficient water to make it fluid), 10 parts of tripoli, 5 parts of alum, 5 parts of cream of tartar, and 5 parts of dry white lead. These should be pulverized together and cast into cakes.

NICHOLAS NOLAN, of New York, thinks he can increase the speed of a steamship by a new form of screw, which has a sort of kicking motion as well as a revolving motion. The arms expand when the kick is made, and contract when brought forward again. This motion has an analogy in the movements of some marine creatures; but its success in combination with a screw is doubtful—at least, in the form in which it is described by an American paper.

WHAT is wanted in a heat-preserving coating is that it shall be fire-proof, frost-proof and full of air holes. In how many cases are these conditions disregarded, and boilers covered with some such plastic coating as cement? This, being a solid material, soon becomes almost as hot as the metal itself; and thus the result looked for is never brought about. At any rate, it results in only a fraction of the fuel-saving which would take place if a proper material were used.

THE following are rules for finding the area of chimney required for boilers:—*Marine boilers*: Allow 14 square inches of chimney area for each nominal horse-power. *Stationary boilers*: The chimney area should be one-fifth greater than the combined area of all the tubes or flues. *Other boilers*: Multiply the nominal horse-power by 112, and divide the product by the square foot of the chimney's height in feet. The quotient will be the required area in square inches.

JAMES DICK claims to have invented a contrivance easily adjusted to stoves and furnaces, by means of which one barrel of oil will equal 2½ tons of coal. The oil is supplied from a tank in front of the boiler, and from the top of the furnace there is a fine attachment providing for the escape of the fumes of burning gas and for the admission of draughts. It is said that the cost of adding the above to any stove or furnace is no more than that of an ordinary hot-water connection.

ZINC, as is well known, is a very difficult metal to cast. One method of making it fill the mould properly is to line the latter with whiting and water, and then allow it to dry. Burning or oxidizing of the zinc may be prevented by covering the metal in the crucible with a little hydrochloric acid, or with a sprinkling of common salt; or still better, on top of it may be placed a layer of charcoal. In the latter case, even if some oxidation does ensue, the charcoal reduces the oxide back again to a metallic form.

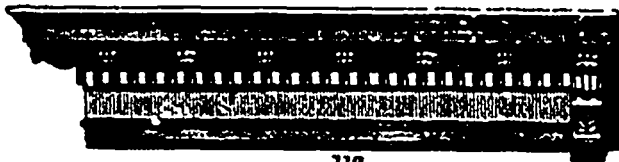
THE officers of the Canadian Society of Civil Engineers are:—E. P. Hannaford, President; Thos. Munroe, P. A. Peterson, and W. J. Jennings, Vice-Presidents; Herbert Wallis, Treasurer; C. H. McLeod, Secretary; W. McNab, Librarian; and H. T.

Bovey, St. George Boswell, H. D. Lumsden, P. W. St. George, J. D. Barnett, Alan McDougall, G. C. Cunningham, G. A. Mountain, C. K. Donville, C. H. Keefer, H. S. Poole, Thos. Ridout, F. R. F. Brown, E. Mohan, and F. R. Redpath, members of Council. According to the last report, the membership was:—Honorary, 6; members, 280; associate members, 124; associates, 69; students, 168. Total, 647.

THE subscription to THE CANADIAN ENGINEER has been fixed at a low price in order to make it easy for every engineer or manufacturer to become its constant reader. "He gives twice who gives quickly," is an old proverb which will apply with special force to intending subscribers—not that a subscription is as much a gift to the publisher as to the reader—but that a ready appreciation is an incentive to his efforts in the line of improvement. Many will no doubt like to preserve the paper for binding at the end of the year. Those who are not in the habit of doing so with their trade papers, will confer a favor by sending their copy, after reading, to some engineering or manufacturing friend.

A. G. HUNTER, of Dundalk, Ont., has invented a machine for the rapid disinfection of hospitals, quarantine stations, etc., which from its simple and portable nature appears to be likely to fill a long-felt want. By means of this little instrument the sulphur di-oxide is given off under the complete control of the operator. It has the further advantage of being able to disinfect clothes and bedding without destroying either their color or fibre. Mr. Hunter has also designed another machine for the purpose of using disinfectants in solution. The carbolic acid or other disinfectant, as the case may be, is sprinkled over the walls and on the furniture in such fine sprays that not the slightest damage is done to them. One sanitary authority expresses the opinion that these disinfectant machines will very soon take the place of the crude methods at present in use.

WITH the exception of the Great Eastern, the "Campania" is the largest steamship that has yet been built. She measures 620 feet long, 65 feet 3 inches broad, and 43 feet deep. Each of her huge funnels is nineteen feet across, and in total length measures 120 feet. The banquet hall, an apartment done in dark mahogany, is 100 feet long by 64 feet in breadth, and its seating capacity is for 430 persons. Altogether, ample accommodation is afforded for 460 saloon, 180-second cabin, and about 540 steerage passengers. The captain's bridge is situated at a height of 60 feet above the sea level, whilst the crow's nest, where the forward look-out is posted, is 40 feet higher still, and commands a radius of 15 miles. The vessel possesses two sets of the most powerful triple expansion engines in existence, each one, it is said, capable of indicating 14,000 or 15,000 horse power. Between these two sets of engines there is a dividing centre-line bulkhead, fitted with watertight doors. In most vessels, the rudder is so placed as to be only partially under water, but in the "Campania" it is so entirely; immediately above it is a well rounded portion of the hull structure. The rudder, which weighs twenty-four tons, is of the single-plate type, and is formed of a heavy steel casting with massive arms, between which there is a thick plate fitted and rivetted. Nothing has been omitted in the "Campania" to ensure safety as well as speed. Her bottom is fitted with the cellular system for water ballast, whilst a great feature is its arrangement of small, water-tight subdivisions.



112

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Waterloo Woollen Co., Waterloo	3 " " "	23% "
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Carling B. & M. Co., Montreal	1 " " "	23% "

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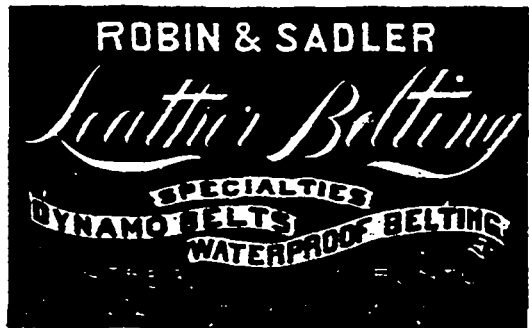
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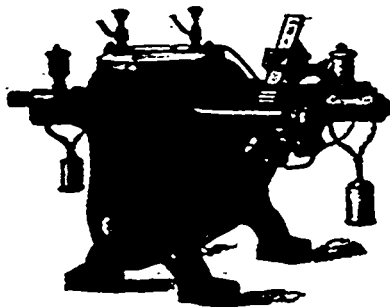
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Industrial Notes.

A NEW iron bridge is to be built at Paisley, Ont.

TORONTO Junction electric light plant will probably be sold.

THE shoe factories of Quebec are working nights to fill orders.

IT is proposed to enlarge the Suspension Bridge at Niagara Falls.

H. LOVELL & SONS, now have their two mills in Coaticook in operation.

THE C.P.R. Co. are going to manufacture Portland cement at Vancouver.

A SCHEME is being agitated for an electric street railway system at Belleville.

TENDERS are called for the new Government buildings at Smith's Falls.

M. P. SHEPHARD'S planing mill, Port Stanley, Ont., has been burned down.

THE Moffat Stove Co. are going to erect a foundry at Weston, near Toronto.

THE first electric car in St. John, N. B., made its appearance on the 1st ult.

THE Brantford, Ont., electric street cars began regular running on the 6th ult.

ARRANGEMENTS are being made for laying a cable across the Gulf of Canso.

BURTON'S saw mills, Byng Inlet, north Ont., have been destroyed by fire.

THE sum of \$20,000 has been voted for the repair of Souris, P. E. I. breakwater.

THE North-west Transportation Company's boats are to be lighted by electricity.

THE Central Bridge Co., of Peterboro, are to erect a new iron bridge at Shell River, Man.

A COMPANY for working the plumbago mines at Elmsley, Ont., will be incorporated shortly.

THERE is talk of the establishment of a piano factory at Cannington, Ont., by the Rahmers.

ROBINSON'S saw mill at Revelstoke, B.C., recently burnt, has been rebuilt and is now running.

A SCHEME for an electric tramway from Nanaimo to Wellington, B.C., is again being agitated.

THE Bell Telephone Co. have been asked to establish a central exchange office at Terrebonne, Que.

MCCAHILL'S flour mill, Forest, has been burned to the ground. Loss \$24,000, with \$15,000 insurance.

A MONTHLY steamship service between British Columbia and Sydney (Australia) is to be established.

THE steel and forge company at New Glasgow, N. S., are making large extensions to their works.

IT is rumored that the G. T. R. will this spring lay a double track between Wyoming and Kingscourt.

CROWE'S saw mills at Belmont, N.S., have been bought by T. Higgins and refitted with new machinery.

ARRANGEMENTS are being rapidly come to for the construction of the Galt and Preston (Ont.) Street Railway.

FRANK L. SOMERVILLE, town engineer of Lindsay, is taking the levels for the proposed sewerage system there.

BREWSTER & LYON, of New York, have begun the manufacture of fulminate of mercury at Prescott, Ont.

WM. CALDWELL, son of the late Boyd Caldwell, Lanark, Ont., is moving with his family to British Columbia.

THE Watson Manufacturing Co. have sent to the World's Fair a large consignment of agricultural implements.

THE Truro Foundry and Machine Company are sending some gold mining machinery to the West Waverly gold mines.

JOHN MILNE & SONS' planing factory at Huntsville, Ont., has been burned. Loss about \$12,000, insurance about \$8,000.

THE idea is being discussed at Carleton Place of cutting a canal from Mississippi Lake to connect with the Rideau or Tay.

THE window shade factory of A. R. McKinlay & Co., Toronto, was destroyed by fire. Damage \$40,000; partly insured. It will be rebuilt.

IT is proposed to start a new furniture factory in Moncton N.B. Paul Lee, wood-work manufacturer, is one of the promoters.

SUPPLEMENTARY letters patent, authorizing an increase of capital, have been issued to the Sherbrooke Telephone Association.

THE G. T. R. have offered to provide the iron and ties and operate a switch line to the harbor in Port Elgin, if the town will do the grading.

THE result of the case of Muirhead v. Evans, Halifax, N. S., has been the sale by the sheriff of the foundry on Kempt Road to plaintiff for \$650.

A SCHEME to connect Steveston and other points on Lulu Island with Westminster, B.C., by electric railway, is being proposed by W. H. Steves.

THE hair factory of John Richards, Victoria, B.C., was burnt the other day. Both machinery and building were a loss, and there was no insurance.

SLEEPER & Akhurst are making three complicated machines for the manufacture of clothes pins and clothes-wire, which are to be exhibited at the World's Fair.

RHODES, CURRY & Co., of Amherst, N.S., are now building cars for the I.C.R., and have now a special shop for such work. Their first work is on coal cars.

THE American Aluminium Company have decided to start a branch of their industry either at Toronto or Montreal for the manufacture of kitchen utensils.

A DEPUTATION from the Canadian Manufacturers' Association have asked the Government of Ontario to offer some inducement for the home production of pig iron.

THE Edison General Electric Company is preparing to build an electric street railway in Peterboro, Ont., and will probably extend its line from that place to Lakefield.

THE Toronto City Council have decided to offer the McCallum Steel Carriage Company, Chicago, a building site on the Don, and are negotiating with the Parks Committee.

THE McCormick M'fg Co. have received from Belle River (Ont.) Council an offer of \$25,000 bonus, 15 acres of land, and exemption from taxation, if they will build their works there.

THE ratepayers of Richmond, Que., have rejected the proposal that the town should take over the waterworks at \$7,000, the price being thought too high considering the repairs to be effected.

IT is proposed to build a large summer hotel at Sydney, C.B., towards which \$20,000 have been subscribed. The Whitney Coal Syndicate subscribed \$10,000 towards it and it is to be finished this summer.

THE C. P. R. have just completed three iron bridges on their main N.B. line, one near Welsford and two at South Brook. It is intended to put in this spring a bridge a mile west of Clarendon and another at Muniack river near Kilburn on the northern division.

THE manufacturing plant of the Canada Electric Co., of Amherst, N. S., has been sent to St. John, to augment the plant of the Consolidated Electric Co. - The Amherst company will henceforth confine their work to supplying light and power in the town.

AMONG the exhibits of the Imperial Oil Co., of Petrolia, at the World's Fair, is a bust in white paraffin wax, of Sir John Macdonald, made by Hamilton McCarthy, the sculptor. This is styled a "novelty in art," and it is at least a novelty in advertising.

THE Victoria Enterprise Manufacturing Company has been established at Brandon, Man., to make bone products. When the factory is running it will produce ivory black, bone black, animal charcoal, assay for smelters, bone ash, fertilizers, glue, soap, blacking, axle oil, chicken food, inks, etc.

FEW Ontario towns have been able to boast of a steadier, healthier growth than Smith's Falls. In 1881, the population was 2,087, and the assessable property \$403,000. In 1891 the population was 4,000, and the assessment \$940,000. This rapid development, although partly due to geographical position, and to the importance given to the town by the C. P. R., must be chiefly credited to the enterprise and perseverance of its citizens. Besides the implement works of Frost and Wood, which employ 250 men, and the Malleable Iron Works employing 125 men, there are some flourishing foundries, planing mills, phosphate works, and many other industries adding to the sum-total of its prosperity. There are excellent shipping arrangements for accommodating the output of the various manufactories, and besides it will shortly be in direct railway communication with Ottawa. So it will be seen that Smith's Falls occupies the site of what may easily become a very flourishing city.

THE Halifax street railway is in the hands of a receiver.

THE new waterworks system at Pembroke, Ont., is being laid.

THE centre pier of the Ottawa and Parry Sound Railway bridge across the Madawaska at Arnprior is completed.

THE work of reconstructing the Bell Telephone System at Peterboro, Ont., is going on apace.

NEARLY eight hundred men are employed in the Charcoal Iron Smelting Works at Radnor, near Three Rivers.

THE arrangements for lighting Niagara, Ont., by electricity will be complete this month.

THE Cookshire, Que., machine works are doing night work to keep up with orders.

THE new draw of the Central Vermont Railway in the bridge at St. Johns, Que., was placed in position on the 16th ult.

THERE are \$2,000,000 worth of new buildings under way or projected this year in Winnipeg.

IT is said that an establishment for the manufacture of broom handles and other turned work will be started in St. John, N. B.

GEO. F. BURTT, Hartland, N. B., lost his saw mill last month by fire. The loss was \$3,000; no insurance.

C. B. WRIGHT & SON have completed a new kiln in their Portland cement factory at Hull.

CARSON, PURGER & CO., of St. Catharines, are the contractors for the new asylum now building at Brockville.

ROBT. MOTT proposes to start a large harness factory at Bath, Ont., this summer.

B. O'BYRNE, who was inspector of the new Ontario Parliament buildings, is now superintending the erection of the new asylum to be built in Brockville.

THE immense iron refuse furnace of Gillies Bros., Carlton Place, is completed and will be started this month. It is situated at Braeside.

BUILDERS and contractors on the American side of the Niagara Falls are taking steps to prevent Canadians from securing contracts.

THE company recently formed to construct the electric railway from Windsor to Sandwich and Amherstburg, are proceeding with their work.

GUELPH has decided to give \$2,500 to the Morris, Field & Rogers Piano Co., and \$2,000 to the Gillies & Martin Foundry Co. to start works there.

THE Peterboro Canoe Co. recently put in a lot of machinery in their new canoe factory. This company have quite a large foreign trade.

J. F. DAVIS, who started the manufacture of granite ironware in Hamilton in 1889, was not able to make it a success, and recently closed up.

A COMPANY has been formed at Albemarle, B. C., to build a system of waterworks, and with power to convey water from several lakes and streams within twenty miles of the place.

JOHN BELL, brother of Thomas Bell of the Wingham, Ont., furniture factory, recently lost a leg by kicking off a belt with his foot while the machinery was in motion.

AN Albany, N. Y., firm have bought a piece of land near Hawkesbury Mills, Ont., and are to erect a wooden ware factory on it.

THE shoe factory of R. Smardon at Three Rivers has resumed operations, an arrangement having been made with the creditors. It employs 200 to 300 hands.

A TORONTO gentleman is reported by the Peterboro Review to contemplate the erection in that town of a piano factory, a furniture factory and a third industry not specified.

THE St. John Telegraph says the manufacture of Portland cement would be a profitable industry there, as the clay and limestone of that vicinity are of the finest quality for the purpose.

THE St. John Bolt and Nut Works are now running up to their full capacity. They have received some heavy railway contracts, one to the value of over \$20,000. Some changes have been made in the working staff of the works. They are still involved in litigation, but this does not affect their operation.—The Sun.

THE business of the Rhodes Curry Co., of Amherst; and of the Harris car works, of St. John, has been formally amalgamated and the by-laws for the new company adopted. The directors are: President, Nathaniel Curry; vice-president, N. A. Rhodes; consulting director, J. C. Robertson; directors, I. R. Black, S. T. Smith and J. M. Townshend, Q. C.; secretary-treasurer, John M. Curry.

THE Nelson, B. C., waterworks system has broken down.

THE Buctouche, N. B., bridge is being pushed forward.

THE Locked Wire Fence Co., Ltd., of Ingersoll, Ont., have begun operations.

A VITRIFIED Paving Brick and Stone Company is being organized at Toronto.

IT is stated that C. E. Gillies, Detroit, is going to set up an emery-wheel manufactory in Canada.

HENDERSON & POTTS, Halifax, have added two stories to their works for manufacturing iron and tin cans and packing cases.

THE Toronto and Richmond Hill Street Railway Co. are arranging to lay their tracks.

THE Ottawa Electric Railway Co. will run cars from the city across the river through Hull, if they get a 35 years' charter.

THE town of Coaticook is talking of a \$30,000 water works system.

THE new Wind Motor Co.'s factory at Woodstock, Ont., is in course of erection.

A NEW iron bridge is to be built between Winnipeg and St. Boniface this summer.

IT is stated that the Montreal Transportation Company are going to locate a floating grain elevator at Prescott, Ont.

THE building of a new dam at the Lorette water works has given rise to a law suit against the city of Quebec.

W. N. ROBERTS, of Renfrew, is the successful tenderer for the building of the new bridge across the Bonnechere river at Eganville.

THE Chatham, Ont., Waterworks Company want the town to subscribe \$50,000 for the purpose of extending the supply pipes to Lake Erie. The total cost will be \$100,000.

THE Montreal Street-Railway Co. will now build all their own cars at the car-shops, Hochelaga, and will also equip a shop costing \$30,000, in which their own electric motors will be manufactured.

THE Berlin, Ont., Piano Company claim to have shipped their pianos to Germany, Scotland, Portugal and Spain during the past year, as well as to all parts of Canada.

JONATHAN WEIR, who died recently at Moncton, N. B., was the pioneer manufacturer of that town. In 1859 he built the first steam engine constructed in Moncton.

THE promoters of the electric railway to run from Hamilton to Guelph, are getting estimates of the cost of the plant. It is proposed to get Engineer Keating, of Toronto, to give the figures.

THE Consolidated Electric Co., of St. John, propose not only to run their street railway there, but to provide the city with a public park, to which, of course, their road will run.

THE Great Western flour mill, recently burnt at Woodstock, is being rebuilt, and the new mill will have a capacity of 300 barrels of peas and oatmeal per day.

A NEW court house is being erected in Winnipeg at a cost of \$80,000, and among the other buildings to go up in that city are fine blocks for the Bank of B. N. A. and the Bank of Ottawa.

HAYES' saw and shingle mill at Millville, N. B., was burned on the 28th ult. The machinery and most of the stock were destroyed, and there was no insurance.

GEO. EATON and Frank Borden are starting an axe factory at Berwick, N. S. Mr. Eaton's shop is being fitted with engine, boiler and other machinery, and the work of manufacturing will soon begin.

A PULP mill will be erected and operated at New Germany, N. S., by Mr. Jones, of Halifax, son of Hon. A. G. Jones, and another by E. D. Davison & Sons. Rumor says that this firm have purchased the saw mill of Cook & Co.

JAMES BAIRD, manager of the Joggins Mines, N. S., is exhibiting at the World's Fair a model of the frog railway switch invented and patented by him. The device does away with the pointed frog, and is now in operation at Maccan and Moncton.

ABOUT 70 miles of new electric railway tracking will be laid in and around Toronto this summer, for which over 300 new cars will be required. Toronto has the best operated electric car service in Canada, if not on the continent of America. By next fall Toronto will have 128 miles of electric car track and about 530 cars on them.

AN electric street railway is now being built from St. Catharines to Port Dalhousie, and will be running early in the summer. Dawson & Sims, the contractors, have bought the St. Catharines and Thorold electric road—which was the first of its kind in Canada—and will re-construct it. It is said another line will be run from St. Catharines to Niagara-Falls.

THE new bridge over the Nashwaak River, N. B., is soon to be finished.

THE town of St. Stephen, N. B., wants power to aid in the establishment of a shoe factory there.

W. N. ROBERTS has the contract for building the bridge at Eganville, Ont.

CHAS. BOECKH & SONS, Toronto, are increasing the capacity of their brush factory.

It is reported that a piano factory is to be started in Quebec City, but particulars are not given.

THE Gatineau Valley Railway Company have erected repair shops at Kazabazua, now the terminus of the road.

THE scheme proposed by Coates & Chapman for building gas works in St. Johns, Que., has fallen through.

GAGNON & Co. have started a shoe factory at Murray Bay, Que., the output of which is to be exported to Great Britain.

AT the annual meeting of the Canadian Iron Founders' Association held recently, W. M. Gartshore, of Hamilton, was elected president.

THE contract for the erection of the public building and post-office at Calgary, Alberta, has been given to W. Alford, Belleville, Ont.

RHODES, CURRY & Co., of Amherst, N. S., have the contract for finishing the interior of the monastery of the Good Shepherd at Halifax, at a cost of \$10,500.

A SITE has been agreed on for the new bridge at Gatineau, Que., and it is expected that the bridge will be finished by the middle of October.

It is proposed to construct a traffic swing bridge over the Burlington Beach Canal, to take the place of the present inadequate ferry service.

GOLDIE'S mills at Guelph, Ont., will shortly be completely renovated. The whole of the machinery will be changed, the interior of the building modernized, and another storey added.

A FACTORY is being started in Chatham, Ont., by the Ontario Excelsior Mfg. Co., for making excelsior, or wood fibre. The company will manufacture coopers' stock, such as headings, hoops, etc.

THE Paper Company's large flume at Alberni, B. C., has been completed, and the contract for the building of the mill itself has been given to Mr. Woods. Everything is to be in working order by August 1st.

ON the 6th inst. an explosion of a quantity of fulminate of mercury occurred in the mixing-room of the Dominion Cartridge Co., at Brownsburg, Lachute. Wm. Maccoy, the man in charge of the department, was blown to pieces.

T. T. SHURITLEFF, W. C. Webster and Dr. Ives, have put in a hoop machine in Jasmin's mill, Coaticook, Que., for the manufacture of hoops. They may later on put in machinery for the manufacture of staves and cheese boxes.

THE Acme Silver Co., manufacturers of silver plated ware, Toronto, are now liquidating their business. Mr. Parker, the president, has been forced to this step owing to an innocent but unfortunate connection with the *Canadian Queen* magazine.

THE Facer Hammered Solid Steel Car and Locomotive Wheel Co. (Ltd.), Hamilton, Ont., has been incorporated under the Companies Act of the Dominion of Canada, capital \$600,000. Its objects are to manufacture steel, and to manufacture and sell car and locomotive wheels.

THERE will be a good many building projects afoot this year at Toronto. Besides the new Union Station with its approaches, the Esplanade bridges, the C. P. R. wharves and freight sheds, and the new Court House, there are many private residences, arrangements for the building of which have already been made.

It is probable that the McCallum Wagon Works of Chicago will establish a branch at Toronto. In the event of this being accomplished, about 100 men would be employed, and steel carriages would be manufactured both for Canada and for export to Australia.

ABOUT \$325,000 will be expended by the Federal Government at Victoria this year on public buildings, dredging and military works, etc., exclusive of the half million to be spent on the Esquimaux fortifications. Besides this the Provincial Government will commence the new Parliament buildings, which will cost \$600,000; and then there is the building of the Victoria & Sydney Railway, the Burrard Inlet & Fraser Railway, the traffic bridge at Westminster, the Revelstoke & Arrow Lake, the Kaslo & Slocan, and Nelson & Fort Sheppard Railways referred to elsewhere.

A. B. CALLIN, pump manufacturer, has succeeded Thompson, of Russell, Man.

THE Victoria Iron Works Co., Ltd., have taken over the business of Wilson Bros. & Co., foundry and machine works, Victoria.

THE Moosomin Elevator Co., Moosomin, Assa., is in the hands of the sheriff, at the suit of the Vulcan Iron Company, of Winnipeg, and will be sold out this month.

THE furniture works of Luke Bros., Oshawa, have resumed operations, and now there is not an idle factory in the town. Quite a contrast to the condition of Oshawa some years ago.

FIRE broke out a few days ago in the machine shop and foundry of A. White & Son, Charlottetown. Both buildings and the stable adjoining were completely gutted. How the fire originated is unknown. Loss on buildings, machinery, etc., \$3,000, insurance \$1,700.

FREDERICTON, N. B., has obtained powers to purchase, by debentures, to the amount of \$6,000, an electric plant for street lighting; and it is proposed to build an electric railway from the city to Marysville, four or five miles across the river. Some Americans are interested, and they expect to cross the river by a light steel bridge.

L. A. MORRISON, George Bennett, A. C. McCallum and Thomas J. Hamil are asking exemption from taxes in Toronto for the establishing of the Perfection Hoop and Veneer Co.'s factory, which it is proposed to move there from Eugenia, Grey county, where the rough timber is gotten out. They propose to establish a number of mills throughout the country, and have the finishing done in Toronto.

STERLING & BROWNLEY have started a brass foundry in St. John. The works are on Dock street, extending back to Nelson street. The two floors opening on Nelson street contain the boiler rooms and moulding shop, while the ground floor on Dock street contains the finishing shop, and above are the offices and pattern room. They are making steam fitters' and plumbers' brass goods.

THE oldest leather belting manufacturer in Canada is James Leslie, of St. Paul street, Montreal, who started work in that city 32 years ago. At that time all the manufacture of leather belting was carried on by hand work; and Mr. Leslie suggested the importation and superintended the erection of the first machinery used in the trade, being at that time in the employ of another firm. At that period, and for years after, there was practically no leather belting made outside of Montreal.

THE Winnipeg *Commercial's* Victoria, B. C., correspondent says: Several new and important industries will soon be in operation. They are all on a large scale, and will mean the employment of a great deal of labor. These are: smelter at Pilot Bay, West Kootenay; Portland cement works, and the British Columbia cooperage and jute works, Vancouver, paint mills and bone reduction works, Victoria; paper mills, Alberni; and oatmeal and feed mills, Westminster. This means a good deal more than speculation in paper railway charters and town lots for the good of the province.

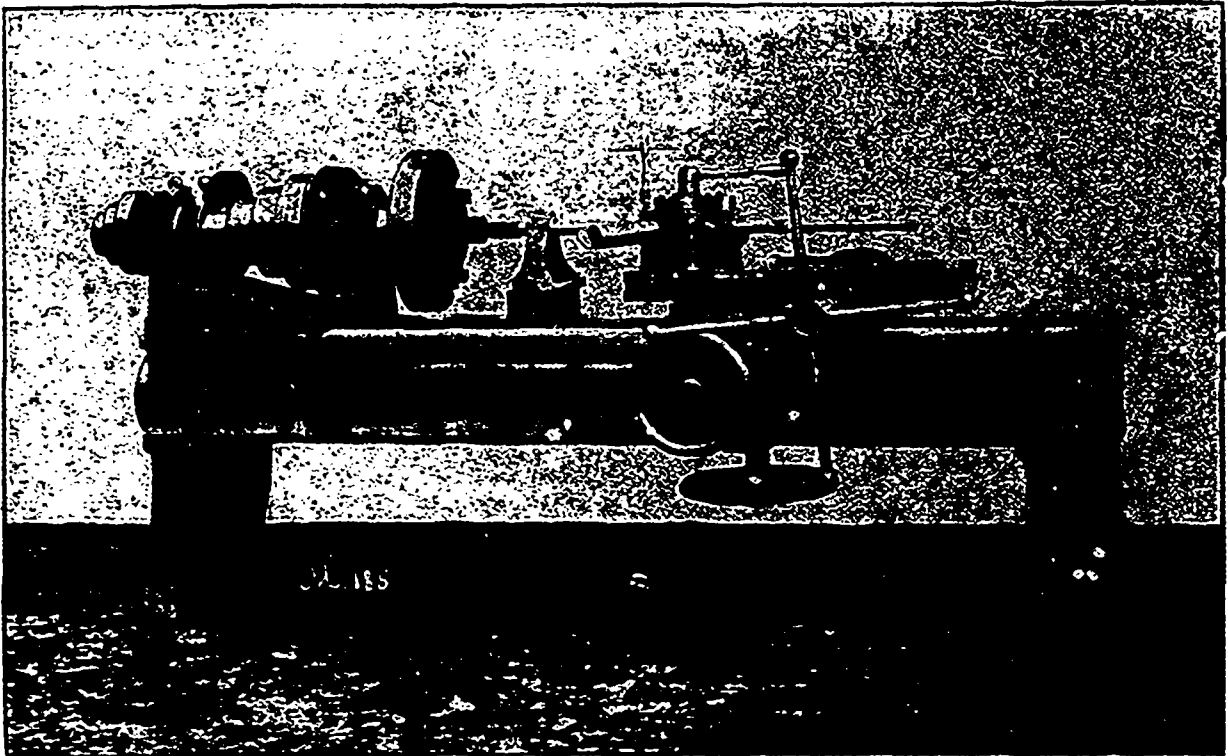
ON the 15th ult. there was loaded at New York the entire plant and equipment for the Toronto Steel Clad Bath Company's English factory. The great presses and rolling machines were made in this country, and will be erected under the superintendence of Mr. James Hutchison, formerly of the Toronto company. The remarkable development of this company is most gratifying; not only to those directly interested, but to Canadians at large, seeing that the whole enterprise emanated from the brains and pockets of Canadians. The Toronto factory is at present being enlarged, and the company are considering plans for a large three-storey building in Detroit. The exhibit at the World's Fair will be representative of the three different factories, viz., Canada, United States and England.—*Empire*.

THE Peterboro Canoe Company's new factory and machinery at Peterboro, Ont., are now completed. They succeed to the business carried on by the Ontario Canoe Company, whose works were recently burned down, and will manufacture canoes, skiffs and yachts of every description, as well as paddles, sails and other necessary fittings. Orders are already in hand for the building of a steam yacht, together with many other smaller vessels. The heating of the new building is to be managed on a new method. An old boiler has been cemented in the cellar, and receives the exhaust steam from the engine boiler. Through a flue in this boiler, the cold air is driven by a fan and made warm, is carried throughout the whole building by means of brick flues. Flues have also been put in on each floor to carry off the cold air.

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 20-IN.

MONITOR LATHE



CANADA TOOL WORKS

John Bertram & Sons

DUNDAS, Ont.

Manufacturers of

**Machinists' Tools,
Locomotive and Car Machinery**

WOODWORKING MACHINERY

Write us for
Photographs and Prices

A NEW pump factory has been started at Floradale, Ont.

THE town of Galt proposes to issue debentures to the amount of \$15,000 for water works purposes.

IT is proposed to make large extensions to the historic Bonsecours market, Montreal, shortly.

HENRY SEWREY, of the Barrie, Ont., foundry, talks of placing his business in the hands of a joint stock company.

THE E. B. Eddy Co., Hull, are this month putting in two more Eno steam generators, this being ten in all they now have in use.

THE switch and frog-making departments of the G. T. R. shops at Hamilton have been moved to Toronto, and the men discharged.

THE basket factory at Strathroy has closed owing to the assignment of its proprietors.

IT is rumored that Menosh & Welcome contemplate returning to Knowlton, Que., to erect a large butter tub and wooden ware factory.

MR. DEWEY, promoter of the screw and wire nail works, has been interviewing citizens of Peterboro as to erecting the factory there.

THE Cortland Electric Mfg. Co. Ltd., has been incorporated. Its object is to manufacture and sell fire and burglar alarms, etc. Capital \$40,000.

THE Trojan Coupler Company, Ltd., has been incorporated. It will manufacture appliances for railway construction, especially those connected with the coupling of cars.

J. H. BINSTAD, C. M. Lapoint, W. C. Hicks and Fred J. Bauer, of Vancouver, are incorporated as the British Columbia Wood Works Co., Ltd., with a capital of \$25,000.

WILLIAM McMILLAN, 28 years of age, was instantly killed in a saw mill at Arnprior the other day. He was caught in the shafting, and had one of his arms torn from his body and both legs broken.

DANIEL MARSHALL, while working in an upper storey of the Riordan pulp mill, Merritton, fell through a hole left by the men who were repairing the floor, and received serious injuries.

THE work of extending the Montreal street railway and converting it into an electric road will cost over \$3,000,000. It is now being pushed by Ross & McKenzie, the contractors.

THE Railway Car Heating and Ventilating Company, Ltd., has been incorporated. Its purpose is to acquire the patent of Samuel Hughes, Lindsay, Ont., for heating and ventilating railway cars.

AT a meeting of the Dartmouth Water Commission the tender of the Truro Iron F. & Mfg. Co., for special castings, at 2½c. per lb., for valves, \$268.47, and that of the Londonderry Iron Co. to supply 4, 6 and 8-inch water pipe required this season, was accepted, at the rate of \$36 per ton, delivered in Dartmouth.

A. W. SPOONER, of Port Hope, Ont., is a Canadian inventor who has been very successful with everything he has placed on the market. His now celebrated Copperine has had immense sales and its use is still increasing. He is now preparing to bring out something new and of special interest to machinery men. Of this some account will be given at an early date.

THE premises of the late Compagnie des Conduits d'Eau Canadienne, of Three Rivers, have been sold to J. A. Charlebois, contractor, of Quebec. The building and land brought \$12,000, and the movables brought 30 cents on the dollar. The sale was made subject to the conditions imposed by the corporation, when it granted the bonus to Cie des Conduits l'Eau, namely, to keep the factory in operation and employ one hundred hands.

THE shingle industry is assuming vast proportions in this district, the American market taking all that can be manufactured. When all the machinery is placed in Parkin & Co.'s new mill the cut will exceed 100,000 per day; Dovey & Son and Burke Bros. cut about 30,000 per day each; and Rathbun & Co. will also cut a large quantity during the season. The output of the small mills up north is mainly handled by Mr. Robt. Bryans, who has already contracted for over 3,000,000.—*Lindsay Post*.

WITH reference to the proposed removal of the Canada Iron and Steel Co.'s works from Montreal to Toronto, the *World* states that Hon. Guildford Smith and G. E. Drummond of this company, and Mr. Keith, engineering expert from New York, were accompanied by the Mayor, Engineer Keating and Surveyor Fellowes in an inspection of Ashbridge's Bay marsh, the other day. The visitors were favorably impressed by the representations made by the city officials, and indicated that in all probability they would submit a proposition for the city's consideration. Over 500 men are employed in the Canadian Iron and Steel Company's works in Montreal.

THE machinery for the new tannery at St. Roch's, Que., has been built at Levis, Que.

THE Record Foundry & Machine Company of Moncton, have opened a branch house at Montreal.

OUT of the 15,940 tons of pig iron exported from the United States, 14,756 tons were received by Canada.

SOME weeks ago the white lead dealers in Ontario advanced the price. It has now been decided to reduce it ½c. per pound.

THE Whitney Coal Syndicate have leased the Wellington Basin, Montreal, from the Dominion Government.

THE contract for building another disinfecting apparatus for the Quarantine station at Halifax, N. S., has been given to Carrier, Laine & Co.

THE Caldwell saw-mill property at Almonte has been disposed of, James H. Wylie having bought the land and buildings, and Mr. Petrie, of Toronto, the machinery.

BURROWS, STEWART & MILNE, stove founders, Hamilton, are now building a large addition to their works, the new shops to be devoted to an extension of their stove and scale works.

THE Montreal Electric Co., composed of John Shaw, W. B. Shaw and W. F. Taylor, have this month opened offices at 302 St. James street, Montreal, as manufacturers and dealers in electrical appliances.

JOHN BERTRAM & SONS, tool makers of Dundas, Ont., recently shipped to the C. P. R. works, Montreal, a switch and frog planer designed to take two 2¼ in. cuts of steel. In a test made before it left the shops it absorbed 35 horse power without damage.

WM. RODDEN & Co. have recently succeeded the old iron founding firm of Day & De Blois, 110-120 Ann street, Montreal. The new firm make a specialty of architectural iron work, furnaces and heaters, steam fittings and general castings.

THE copper and chandelier branch of the works of the James Morrison Co., recently burnt at Mimico, will be rebuilt this fall at the same place. In the meantime the work is being carried on in a new addition built at the back of the firm's warehouse on Adelaide street, Toronto.

THE saw and lead works of James Robertson & Co., King street West, Toronto, which were burnt last month, are now being rebuilt on the same scale as before. The loss by the fire was about \$65,000, which was fully covered by insurance except on the item of machinery.

C. W. HENDERSON & Co., electricians, have moved into a fine building in the newly widened part of Bleury street, Montreal. They have their works at the back of their show rooms, and are making a specialty of model and pattern making and experimental work, as well as construction work in the electrical line.

E. W. RATHBUN of Deseronto, and John Bell, Q. C., of Belleville, solicitor for the Rathbun Co., are now in London, Eng., negotiating the transfer of the big Rathbun works at Deseronto to an English syndicate. This will include the mills, railroads, steamboats, timber limits and all the other industries built up by the Rathbuns on the Bay of Quinte and the northern waters.

THE Dominion Bridge Company are hustlers and can build a bridge in short order. At the beginning of the month the iron for the Ferry Bridge, some five or six spans, was on the sea in an unmanufactured condition. Last week the iron work was in place on the bridge and nearly all the riveting completed. As the swing was only rebuilt a couple of years ago, it has not been disturbed, and only the fixed spans are of steel.—*Perth Expositor*.

THE iron moulders of Hamilton gave up their strike on the 13th of last month, after being out 15 months. The international union withdrew their support a couple of weeks previous, but the local union held on in the hope of inducing the shops to run as union shops, but this failed, and the moulders, therefore, have lost on both points—the question of the 10 per cent. reduction and that of the control of the foundries by the unions. It has been the most notable strike in the annals of iron moulding in Canada.

E. F. CAIRNS, of London, Eng., interested in the Lillieshall Coal and Iron Company, and Brookdale Coal Company, Shropshire, is in Canada studying its advantages for iron works. He said he proposed to establish works in Canada for the manufacture of mining machinery. He believed in a country with mineral resources such as Canada possessed there ought to be a good opening for such a business in the Dominion. He might choose Montreal, Toronto or Ottawa, all of which he had visited. He expected no bonus or exemption. Associated in the enterprise are Richard Evans, of Haydock, the largest single colliery proprietor in England, and Lord Granville.

THE foundries and machine works at Oxford, N. S., have been very busy.

A. & R. LOGGIE, of Northumberland, N. B., have rebuilt their fruit canning factory.

THE Hamilton Bridge Co. are building an arch bridge over Stoney Creek, B.C., to be finished in August.

A LARGE number of vessels are loading coal at the Joggins, N. S. The new electric light plant is in operation.

THE C. P. R. are this year going to erect another elevator and a flour warehouse at Fort William, Ont.

THE Rathbun Company of Deseronto, Ont., has received an order from England for 5,000 ready-made house doors.

THE RAND DRILL Co. are making a new pneumatic pump for a gold mine. It carries 150 gallons per minute a height of 150 feet.

THE completion of the Quebec Harbor Works is being agitated for. The commissioners have in hand \$300,000 for this purpose.

CONTRACTS for the mason work at the new Sacred Heart Convent on Alexander street, Montreal, have been awarded to Huberdeau & Co. for \$77,000.

J. E. HAMPSON, machinery agent, Victoria Square, Montreal, has just sold two creamery engines for the Killey-Beckett engine works, Hamilton.

PECK, BENNY & Co., of the Canada Rolling Mills Co., Montreal, are moving their offices this month from St. Paul street to the new Board of Trade building.

THE Hamilton Radial Electric Railway are applying for incorporation. They are asking authority for the use of either steam or electricity as a motive power.

MICHELL, LEFEBVRE & Co., the vinegar manufacturers of Montreal, have purchased the old Berthier beet root sugar factory and are going to revive this industry, having arranged with the farmers for 4,000 tons of beet roots.

A SOCIETY of stationary engineers has been organized in Berlin, Ont. The work of initiating new members was conducted by Bro. Eakins, Toronto, President of the executive, and Bros. C. J. Jordan, Robert Green and James Tuck, of Guelph.

THE Montreal Stave and Barrel Co., composed of R. Gardner, J. C. King, E. L. Bond, D. S. Walker, W. J. Pullan, Jos. N. Babson, David Seath, E. Beausoleil and A. M. Perkins, has been incorporated with a capital of \$12,000.

THERE is plenty of work to be done in Quebec this year. The C.P.R. are going to build a new station and an elevator, the fortifications will come in for their share of improvement, and besides these works and the completion of the harbor, there are several streets to be enlarged.

THE chancel railings and other interior metal decorations that have been so much admired in the Church of the Messiah, Toronto, are the work of H. M. Flock & Co., manufacturers of metal specialties, Adelaide St. West, Toronto. This firm are obtaining a good reputation for their work in oxidized copper, etc.

THE failure of A. J. Yates and H. H. Warner of Rochester, who were the principal stockholders of the Ontario Coal Co. of Toronto; has brought about the assignment of that company, with liabilities of nearly \$1,000,000. It is probable a reorganization will take place, which will greatly reduce the loss to creditors.

PRNDER & Co. of St. John, N. B. have a patented method of rusting nails to make them hold more firmly in wood. Parmenter & Bullock, of Gananoque, have a similar method. The New Brunswick firm have taken proceedings at Osgoode Hall against the Ontario men for an injunction for an alleged infringement of patent.

THE business that has been during the last 38 years carried on under the style of Brown Brothers, stationers, bookbinders and manufacturers, Toronto, has been formed into a joint stock company under the name of "The Brown Brothers, Limited." The ancestors of Brown Bros. were in the stationery business or generations in the old country; and their reputation for superior work is unsurpassed in Canada.

THE metal paint manufactured by John Towle & Co., De Lorimier Ave., Montreal, is now being adopted by foundries as a substitute for Japan, than which it is much cheaper, being 20 cents a gallon by the barrel. It will not burn when the metal on which it is applied is heated, but will bake on and become a sort of enamel. The subject is well worthy the investigation of foundrymen and others engaged in metal work.

THE Ferrona, N.S., iron works are now producing 70 to 80 tons of pig iron per day.

RENNIE & CAMPBELL succeed the Columbia Carriage Factory, Vancouver.

SILAS McNUTT, of Springhill, proposes to start a soap factory at Amherst, N.S.

THE C. P. R. cement works, Vancouver, B. C., are now in working order.

OWING to the hitch in the contract for the new court house of Toronto, the work will now be finished by day labor.

THE Hinckley & Egery Iron Co., Bangor, Me., recently shipped two sulphur burners to the Maritime Sulphite Fibre Co., Chatham, N. B.

THOMAS ALCOCK and Horatio Goodes, proprietors of the Standard Foundry Company, Toronto, have assigned to T. M. Higgins.

THE adjourned annual meeting of Wm. Parks & Sons, Ltd., cotton manufacturers, St. John, N. B., was held this month, when the business of the company was reported to be in a most satisfactory condition. The sales for the month of April amounted to nearly \$60,000.

AT a meeting of the provisional directors of the British Pacific Construction Company held in Victoria, the following were elected directors for the ensuing year: R. P. Rithet (president), Thomas Earle, Col. E. G. Prior, F. S. Barnard, Theo. Lubbe, C. A. Vernon, E. Crowe Baker, W. H. Ellis and Frank Bakeman.

THE Northey Manufacturing Co. of Toronto have a power pump of a capacity of 800 gals. a minute under way for the Montreal Cotton Co.'s works, Valleyfield. They are delivering a second large pump for the Marmora gold mines, and among others they have orders for steam pumps from the Dominion Government, the Canada Atlantic Railway and the Pembroke Water Works. They are putting a large condenser into the works of Br. Am. Starch Co. at Brantford, and two artesian well pumps for parties in Montreal.

AT the annual meeting of the C. P. R. this month it was decided to lease the Lake Maskinonge Railway. It was decided to spend \$1,000,000 on bridges, \$730,000 on elevators, \$1,250,000 on rolling stock; acquiring bonds of the Ottawa and Montreal Railway, \$40,000; and nearly four millions upon the construction and extension of the Souris branch from International boundary, on the Pasqua, Revelstoke branch, the Temicamingue branch, and the Esplanade branch.

THE Ontario Rolling Mills, Hamilton, have put in a powerful shearing machine from the shops of John Bertram & Sons, Dundas. This immense tool, which is used for punching the holes in railway fish plates, as well as for shearing, weighs 32 tons, and punches six holes at a stroke. It will cut a piece of iron 50 inches long and 1½ inch thick. It was finished in two months from receipt of order, though special designs had to be made for it. A similar tool was made for a Nova Scotia iron works, and these are the largest and most powerful tools ever made in Canada. One of the customers of John Bertram & Sons was under the impression that no shop in Canada could produce a casting of over 20 tons, and was surprised when this fine machine was turned out from Dundas. John Bertram & Sons sent to the World's Fair a 5-ton iron planer, an engine lathe, a 16 inch-shaper and a drill. The planer, as well as the other tools, was from their own designs, and takes up less space, while affording more power, than any other make. This firm made a fine exhibit of their tools at the Colonial and Indian Exhibition in London, in 1886, and as a result sold machines to several foreign countries, but the tools sent to the World's Fair are a great improvement in design, utility and finish to those. It is doubtful if any machinery of the kind in the great show will excel them.

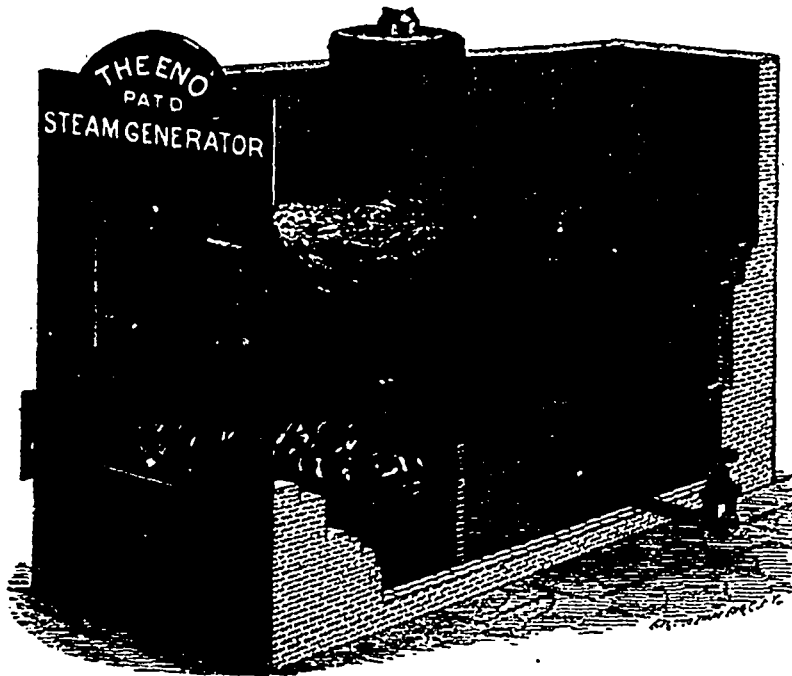
OLD IRON.

THE three oldest known pieces of wrought iron in existence are the sickle blade that was found by Belzoni under the base of a sphinx in Karnac, near Thebes; the blade found by Col. Vyse imbedded in the mortar of one of the pyramids, and a portion of a cross-cut saw which Mr. Layard exhumed at Nimrud—all of which are now in the British Museum. Another old piece of iron is the wrought bar of Damascus steel which King Porus presented to Alexander the Great. This bar, which is of unknown antiquity, is still carefully preserved in the National Turkish Museum, at Constantinople.

STEAM GENERATION.

The Eno Steam Generator, which has obtained a wide reputation in the United States, and is now being introduced into Canada, has received some strong endorsements from leading engineers in Toronto and elsewhere.

The generator proper consists of a series of pipe flues, numbering from two or more, according to size of boiler, or results required. Each flue is composed of an inner and outer tube, thus containing a water space between them that is always charged with the water



of the boiler. These flues commence at the front of the bridge wall, and extend rearwards therefrom, thereby offering no obstruction to the direct action of the fire on the crown plate or other parts of the boiler.

It will readily be seen that the apparatus gives the boiler a large additional fire surface (120 square feet, or more, according to size of boiler or result required), with only a very small additional amount of water. It keeps constantly in the fire a sheet of water over six feet square and only $\frac{3}{8}$ of an inch thick, with both sides exposed to the fire, thereby converting the water into steam with great rapidity, as well as causing an immense circulation.

The flames and heated gases, when leaving the fire box, pass through the inner tubes and also surround and envelop the outer ones, thereby converting the contained water into steam with the utmost rapidity, and least expenditure of heat. The water through the pipe in the rear of the boiler flows in a steady current, into and through the tubes, re-entering the boiler as water and steam, through the two pipes at the front, maintaining thereby a continuous circulation of the water through both boiler and generator, largely preventing the formation of scale, and increasing the efficiency as well as the durability of the boiler.

As a large quantity of the steam is formed in the flues of the generator instead of in the bottom of the boiler, it does not have to ascend through the water after its formation; but passes onward through the tubes in the fire chamber, where its heat is still further increased, thereby producing a pure, dry steam, instead of the saturated compound obtained from boilers by the ordinary process.

An agency for this invention has been established at 35 Richmond street west, Toronto.

PAINTING OF STRUCTURAL IRON.

At a recent meeting of the Engineers' Club, of Philadelphia, Edward Hurst Brown read a paper on this subject, in which he described the composition of paints for use on wood and metal surfaces, with particular attention to the proper material to use on structural iron work. He said that it is very essential that the iron itself should be absolutely free from rust, as the latter will spread from a point under the paint if there be the slightest chance for it to do so, flaking off the paint and thus gradually exposing the bare sur-

face of the iron to the destructive action of oxygen in the presence of water.

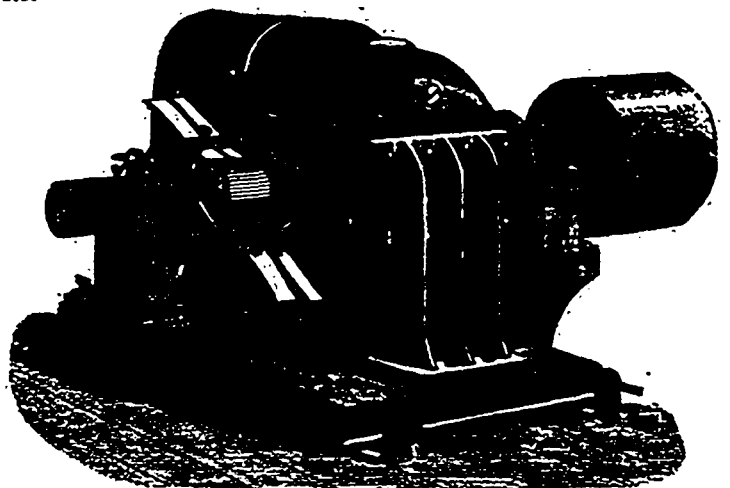
The iron should be prepared by removing the scale with a stiff wire brush and destroying the rust by a pickle of dilute acid which must be afterward washed off before applying the paint. For use on iron exposed to changes of temperature, to gases or moisture, a paint was recommended called "anti-rust," which is manufactured especially for this purpose. Sections of iron pipe were shown which had been painted with this material and with other kinds of paint, and exposed to various severe conditions of temperature and oxidizing gases.

The writer considered it very important that specifications for painting engineering constructions should be carefully drawn and strictly adhered to, even to the specification of definite brands or makes of materials. The engineer should experiment, in order to determine the best paint to use under given conditions, or should seek advice on the subject from those who have made its manufacture and its wearing qualities the study of their lives. It is poor economy to use any but the best material obtainable, the saving in the first cost being more than counterbalanced by the labor of renewing the paint in a comparatively short time.

KAY ELECTRIC WORKS.

Few electrical firms in Canada have made more substantial progress than the Kay Electric Works Company, of Hamilton, and perhaps this is due as much to the intelligence, spirit and industry of its manager, Mr. Douglas, as to the general excellence of its machines. In one respect at any rate, the motors made by this company may be relied upon. Their construction is thoroughly substantial and at the same time is as simple and uncomplicated as it possibly can be. The various parts of their motors are easily removed for examination or repairs, and are well protected from external injury. A special feature of their manufacture is that they can make a motor specially adapted to the nature of the work which is required to be done: There is no waste of power owing to the machine being adapted rather for something else than for the task immediately in hand. For this reason they are used equally in knitting and pulp mills, in printing works, for elevators, in factories and foundries, and for grain-crushers; and we believe that a person wishing any other kind of work whatever performed, could easily, by merely stating his needs to this company, have a specially adapted motor constructed for him.

The Kay Electric Works also manufacture an electro-plating



KAY ELECTRIC MOTOR.

dynamo, suitable for small shops requiring but a little electrical power. Its weight is 90 lbs., and it will operate a nickel solution of 60 gallons or deposit about 5 ozs. silver per hour.

The Kay Storage Battery is another useful invention. It is very easily operated and is employed in cases where a large amount of power is not needed, such as by dentists. For all practical purposes it is indestructible, will stand a high rate of discharge without injury, and there is no possibility of disintegration, buckling or short-circuiting.

Railway and Marine News.

THE Portage and Western Railway are applying for incorporation.

A NEW steamer, the "Mermaid," was launched at Vancouver this month.

THE Marine Department is calling for tenders for the erection of three new light houses on French River, Ont.

ENGINEERS have located the Louisburg Railway, which is to run via St. Peter's to Port Hawkesbury, Cape Breton.

THE Parry Sound Railway Co. has given the contract for 40 miles of the road, from Arnprior to Eganville, to E. F. Fauquier.

OVER 300 men are working on the Quebec and Lake St. John Railway, between Jonquieres and Chicoutimi, and more will be put on soon.

THE deed of right of way for extension of the railway round the harbor front at St. John, N. B., has been executed, and tenders will be invited.

MR. W. DUDLEY, stationary engineer at the Lindsay car shops, has been promoted to the position of engineer at the company's elevator at Midland.

THE construction of the new line from Quebec to Grenville in connection with the Ottawa, Arnprior and Parry Sound Railway, is about to commence.

THE new boat running in place of the "Rideau Belle," between Kingston and Ottawa, is now ready and out of her builders' (Davis & Sons) hands.

THE new Steamship Navigation Co., lately incorporated for the Maritime Provinces, are negotiating with parties for a suitable boat for the river trade.

THE C. P. R. has given a contract for the erection of new depots at Portage la Prairie, Brandon, Regina and Calgary, to Mr. Tompkins, of Brockville, Ont.

THE bill to incorporate the Toronto and Sudbury Railway has been thrown out of the Ontario Parliament on the ground that application should be made at Ottawa.

THE St. John papers say there are now prospects of the railway from Barnesville to St. John by way of Loch Lomond being put through by Philadelphia capitalists.

TWO new steamers, the "State of Idaho" and the "Spokane," are to be finished and running this month from Bonner's Ferry to Kaslo and Nelson, B.C., making a daily service.

D. F. MAXWELL is engaged at surveying at Milltown, N.B., for the proposed St. Stephen and Milltown railway. Mr. Maxwell is confident that the road will be built this year.

CAPT. TOWERS, of the propeller "Ocean," has been appointed superintendent of the Richelieu & Ontario Navigation Co's boats, having supervision of all the Company's steamers.

THE Windsor and Annapolis Railway has purchased the Western Counties Railway, and will now control the whole line from Halifax to Yarmouth. The line will now be known as the Dominion Atlantic Railway.

THE new tug belonging to Galna & Danter was successfully launched the other day at Parry Sound, and named "Geraldine." It is the intention of her owners to use her in connection with the summer tourist trade.

ALL the bridges on the Baie de Chaleurs Railway are now complete, and the line will soon be open for traffic. It will probably be bought by the Atlantic and Lake Superior Railway Co., in conjunction with the M. P. R.

IN shipbuilding Great Britain is far and away ahead of any other nation—in fact, a single yard in Belfast produces more tonnage than any single continental nation, and the production on the Clyde is nearly three times as much as that of all the continental nations together.

CANADA has now 14,869 miles of completed railway, and 218 miles under construction. The total amount of capital represented by this vast system is \$869,068,477. The aggregate earnings are \$51,685,768, leaving a balance of \$15,197,539 after paying the ordinary expenses.

C. F. GILDERSLEEVE, president of the Kingston, Smith's Falls and Ottawa Railway, says the route of the road from Kingston to Smith's Falls has been settled, but from Smith's Falls to Ottawa it is still undetermined, but will probably be along the Rideau if the municipalities will aid it.

EBEN GASKILL, Allen O. Gupill, Isaac Newton, Nelson H. Small, John A. Ingersoll, Frank Ingersoll, Wm. E. Tatton, H. Hamilton Bancroft, Wm. L. Kent, Nelson L. Wormell, all of Grand Manan, have obtained from the N. B. legislature incorporation as the Grand Manan Steamboat Company, with a capital stock of \$20,000.

THE Canada Atlantic and Plant Steamship Company has been organized at Halifax, with the following officers: H. B. Plant, president; M. F. Plant, G. H. Tilley, E. C. Richardson, E. G. Smith, W. J. Butler and J. A. Leaman. R. G. Smith is treasurer, and H. L. Chipman secretary. Their steamers will run between Halifax and Boston.

THE Furness Line running between London, Halifax, St. John and Boston, are adding two large fast cargo steamers to their fleet, at a cost of £222,400. The company will now be known as Furness, Wilby & Co. Ltd. The Furness Line has done much to help the trade of the Maritime Provinces, and some of their passenger boats are as comfortable as could be wished by any one who is travelling for the sake of a sea voyage.

THE Toronto, Rochester and Montreal Steamboat Company is making its final arrangements, and expects to have boats running before the end of the present month. The promoters state that they are going shortly to give the contract for the building of two new boats, and also that connections with several American railroads have been arranged. The capital of the company will be \$1,000,000, of which \$300,000 has been already subscribed.

THE engineers for the Manitoulin & North Shore Railway have prepared their plans for the road which is to be built this summer. The road runs from Little Current on the Grand Manitoulin north-east to Nelson station on the Sault branch of the C. P. R., a distance of 40 miles. Only one bridge of 450 feet is required to connect the island with the mainland. The road will be valuable for the transportation of the nickel, iron and other ores of the northern region.

THE following are the officers of the Canadian Inland Marine Association for 1893. President, Capt. Crangle; Vice-President, J. T. Matthews; second Vice-President, Capt. Sylvester; secretary-treasurer, W. A. Geddes. The headquarters of the association are in Toronto. At its last annual meeting this association placed on record its opinion that in the interests of the St. Lawrence route the Dominion Government should grant a site for a 500,000 bushel elevator at Kingston.

THE Star Line Steamship Co. has been incorporated with headquarters at Gagetown, N. B. They are to build and run steamers on the St. John and its tributaries, and of the applicants the first mentioned five are provisional directors: George F. Baird, St. John, ship owner; Thomas P. Taylor, of Sheffield, Sunbury county, farmer; Charles W. Starkey, St. John, master mariner; Walter Allison, St. John, merchant; Thomas Bullock, St. John, merchant Robert Orchard, St. John, accountant.

THE steel screw steamer building at New Glasgow, N. S., is 122 feet keel, 30 feet beam. She will ply between Mulgrave and Point Tupper as a ferry boat for the I. C. R. The stern frame is raised and part of the keel laid. The plates and part of the other building material are made in England or Scotland, but are fitted by Mr. Matheson of the Acadia Foundry, New Glasgow. This will be the second steel steamer built by him at New Glasgow. The first was a tug boat. Small steel plates are rolled at Trenton, but not as heavy as are required for this vessel.

THE following case recently decided by the Court of Appeal in Toronto will be of interest to manufacturers and contractors: Kerr Engine Co. v. French River Tug Co.—Judgment on appeal by the defendants from the judgment of Boyd, C., at the trial at Sandwich, in favor of the plaintiffs, awarding them \$1,300 as the balance of the contract price of \$7,400 for putting an engine and boiler into a tug. The plaintiffs' claim was \$1,350, balance of the contract price, and \$428 extras. The contract provided that the engine and boiler should be placed in the tug on or before the 18th April, 1892, the plaintiffs undertaking to pay \$20 a day as liquidated damages for every day's delay after that date. There was a delay of about two months. The defendants paid \$750 into court as defended as to the residue claimed, asserting a counter-claim or set-off of \$1,200 for the delay. The learned chancellor allowed the defendants \$280 for 14 days' delay, but as to the rest of the delay he held that the defendants were responsible for it. The plaintiffs opposed the appeal, and made a cross-motion to increase the amount awarded to the plaintiffs. The court held that the damages to which the defendants were entitled and the money paid into court were together sufficient to satisfy the plaintiffs' claim. Order made that the money in court be paid out to the plaintiffs, and that they pay the costs of the action.

THE proposed railway from Tilsonburg to Lake Erie will probably be abandoned.

WORK has been begun on the new Grand Trunk cantilever bridge across the Niagara.

THE Drummond County Railroad are going on with their line from St. Leonard to Chaudiere.

A BONUS has been asked for to aid in the construction of the Bracebridge and Trading Lake Railway.

THE steamer "Grandholm" has been chartered for the route from Vancouver, Victoria and Sound ports to Hawaii.

THE repairs on the disabled Allan steamer "Pomeranian" were executed by W. W. Howell & Co., machinists, Halifax.

AN inventor claims to have discovered a method for propelling a vessel at the rate of 35 miles per hour by means of a series of explosions.

THE Toronto and Scarboro Electric Railway Company have let the contract for grading, tracklaying and erection of trolley poles to A. Walsh.

THE Carp, Almonte and Lanark Railway are going to extend their line from Ottawa to some point on the G. T. R., probably Cobourg or Oshawa.

IT is reported that the Canadian Electric Railway Co. have secured the privileges of the Table Rock House and the museum in the park, Niagara Falls.

A NEW steam tug, the "John Logie," was launched at Goderich on the 2nd inst. It is a powerful tug, built by Wm. Marlton to be used in the fishing trade of Lake Huron.

J. R. BOOTH, president and owner of the Ottawa, Amprior and Parry Sound Railway, has asked for a grant of \$3,000 a mile to construct the part of the line from Barry's Bay to Scotia.

A NEW steamer of 1,850 tons has been launched at Greenock Scotland, for Wm. Thomson & Co., St. John, N. B. She is called the "Marathon," and is to be used in the Maritime Province coasting trade.

A MARINE Engineers' association has been formed at Halifax. It is to be entitled the "Canadian Marine Engineers' Association of Halifax," and has for its object the social intercourse and mutual improvement of its members.

THE Nelson & Fort Sheppard road at the B. C. boundary will touch at Sayward, and the construction work begins this month. This point will be made the landing place of all Columbia River steamers, and extensive wharfs, etc., will be constructed.

THE Grand Trunk have men at work laying the spur line from the Chemong line to the mills of the Peterboro Milling Company. Work is now commenced by the Grand Trunk on improvements on the Missing Link line between Peterborough and Omamee:

A NEW steel steamer called the "Bannockburn," built for the Montreal Transportation Co., was launched last month at Middlesborough, Eng. She will be taken apart at Montreal and will be shipped on pontoons to Kingston, where she will be put together for service on the lakes.

THE new wooden steamer "City of Collingwood," built for the North Shore Navigation Co., was launched at Owen Sound on the 3rd inst. Her dimensions are: Length 215 feet, beam 34 feet, depth 13 feet 4 inches. She has triple expansion engines of 1,500 horse power, and has accommodation for 180 cabin passengers. She will be placed on the Sault route.

THE new Burrard Inlet and Fraser Valley Railway, of B.C., which has been transferred to the Northern Pacific, will be aided by the local Government and Westminster. The bridge over the Fraser River will cost about \$750,000. The railway will open up the whole of the Westminster district. The Northern Pacific will also take charge of the railway from Sumas to Vancouver.

A DEPUTATION lately interviewed the Ontario Commissioner of Public Works asking for improvements to facilitate the navigation of Lake Nipissing. The proposition was that a rolling dam be constructed at the outlet of the lake, which is the French River, so as to retain the water four feet above low water, and that the Government build a new dock at North Bay, or assist in improving the existing C. P. R. dock there.

DAVID POTTINGER, General Manager of the Intercolonial Railway, says the prospects are bright for this season's traffic. For the ferry service, at the Straits of Canso, a powerful tug boat is being built, while a large scow, capable of carrying four passenger cars, is under construction at Port Hawkesbury. With these facilities for ferrying the straits, it will be possible to run through trains. Mr Pottinger states that last winter 2,000 tons of coal for the Montreal Gas Works were carried from Sydney.

THE finest steamer yet built in Hamilton was launched there on May 2nd. She is called the "Chippawa," and was built by the Hamilton Bridge Co. for the Niagara Navigation Co., her route being between Toronto and Niagara River. Mr. McNichol and Mr. McMaster had charge of the construction work, under the supervision of Logan & Rankin, of Toronto. The engine was supplied by W. & A. Fletcher, of Hoboken, N. J., and the other machinery came from Scotland. The cylinder is 75 inches in diameter, and 11 feet stroke, and the paddle wheels 25 feet diameter, designed to make 33 revolutions per minute. The "Chippawa" is 311 feet over all and 36 feet beam, exclusive of width of paddle boxes.

IMPROVEMENTS IN BUILDING MATERIALS.

Improvements well worth noting are being made from year to year in architectural work. Metal ceilings, though not yet adopted by many good architects and builders, are making their way, and the demand is growing to such an extent that Dougias Bros, the well known manufacturers of sheet metals, Adelaide St., Toronto, have now in operation a factory for their special manufacture. In the production of this work large and expensive dies are made, and the sheets of metal, which consist of No. 26 smooth-finished iron, are stamped in the design required, the edges forming mouldings, by means of which invisible joints are made when the pieces are put up edge to edge. Tin plates are also formed into embossed ceilings of a more highly ornamental character. One of these patterns is shown in the accompanying cut.



The advantages of these ceilings are that they do not crack or fall off, and do not show stain spots when a leak occurs in the roof; they do not shrink like wood nor require to be papered over or repaired year after year, and what is important, they are fire proof. There are other advantages, among which lightness is by no means unimportant. In a room or hall say 30x30 feet, the average weight of plaster is 3 tons, whereas the weight of the metal walls and ceilings is only 500 lbs. Kivas Tully, the chief architect for the Ontario Government, having tested the metal ceilings, will not have anything else in the buildings erected under his supervision. These ceilings are made in styles suited for any kind of building.

Of similar character, as far as advantages over plaster are concerned, are the metal laths manufactured by the Metallic Roofing Co. of Toronto. These laths are made of sheets of metal punctured in such a way that when the plaster is put on it has a remarkably firm hold, and it is found that the cracks which disfigure walls when wood laths are used do not occur with the new metal laths. Moreover these, as in the case of metallic ceilings, have the very important advantage, among others, of being perfectly fire proof.

John Towle & Co., of the Victoria Paint Works, Montreal, have placed on the market more than one special kind of paint for roofing, for which some strong claims are made. One kind can be applied equally well to wood, slate or metal, and be used as a substitute for japan. It will resist frost, and on the other hand is improved by heating, in that it bakes hard without cracking.

Personal.

THOMAS DOYLE, foreman of the P. E. I. Railway blacksmith works, is dead.

B. D. McCONNELL has been appointed town engineer of Cote St. Antoine, Que.

OSCAR VOGT, of Galt, has charge of Shurley & Dietrich's exhibit at the World's Fair.

COL. BUTTERFIELD has returned to Rock Island, Que., from a trip, much benefited in health.

J. S. DRURY has accepted a position on the surveying staff of the British Columbia Government.

WM. JOHNSTON, late locomotive and mechanical foreman, Richmond, Que., is removing to Toronto.

OWING to ill health John Ennis has resigned his position of chief engineer of the Oxford Mills, Norwich, Ont.

THOS. LAIRD, engineer for the Perkins engine works, Toronto, died this month in an apoplectic fit. He was 69 years of age.

FREDERICK L. SIMS, of Toronto, has been appointed manager of the Steel Sink, Boiler and Stamping Co., Mimico, Ont.

HON. MR. OUMET and Mr. Coste, chief engineer of public works, are on tour in British Columbia, inspecting the public works.

JONATHAN STEVENS, proprietor of the steam wood-working factory at Riverside, N. B., has been seriously injured in an engine accident.

W. C. BUCKLEY, formerly of Montreal and late of Chicago, has been admitted a partner in the Southwick Oil Co., with offices at Chicago.

J. A. WHELPLEY, skate manufacturer, Greenwich, N. B., died last month after a short illness. The death occurred in a New Hampshire town.

DANIEL McEWAN, of the late firm of McEwan & Son, machinists, Kingston, died there last month. He was a very old and respected resident and carried on business for years.

MR. RENNELS, the new superintendent of the Moncton and St. Flavie division of the I. C. R., was presented with an address on leaving Truro to take his quarters at Campbellton, N. B.

F. W. COWIE, hydrographic surveyor of the Public Works Department, has begun work in connection with the proposed survey of the ship channel between Cape Charles and Quebec.

DONALD McNEIL, locomotive engineer on the Intercolonial Railway, and one of the oldest and best railway men in Quebec, died of diabetes at his residence, River du Loop, last month.

F. J. H. WISE, of the Vancouver Coal & Land Co., of Nanaimo, has been at Peterboro examining the new electric mining locomotive turned out from the electric company's shops there.

DAVID PRESTON, mechanical superintendent of the C. P. R., works in Montreal, died a few days since from blood poisoning produced by the use of a solution applied to a corn. He was 60 years of age.

JOHN WILLIAMSON was drowned in his own mill at Hawkestone, Ont., a few days ago, while fixing some machinery near the water wheel. There is a mystery about this. He had money and notes on his person, which have not been found.

SILVER MINING OF THE FUTURE.

THE EFFECT OF THE KOOTENAY DEVELOPMENTS.

Editor of the CANADIAN ENGINEER.

Few people in the east are aware of the unusual activity in silver mining in British Columbia. The most striking phase of the question is the fact that American smelters are beginning to look to Canadian mines for the necessary fluxing ores hitherto provided by the home and Mexican mines. There are two reasons for this. Owing to the low price of silver so many of the American mines have closed down that the home supply of fluxing ores is likely to be wholly inadequate. The second reason is the fact that the ores of Kootenay are very much better for fluxing than are those of the United States. This state of affairs may lead to results that will astonish those who have been giving no thought to this important subject. That Canada may be the silver producing country, *par excellence*, on this continent, is within the range of possibilities. Suppose silver to remain at present low figures, or go even lower what would be the inevitable result? Our ores would become an absolute necessity to the running of the immense smelting

plants across the line. It has been demonstrated that the rich Kootenay mines will pay at prices for silver far lower than it seems possible for it to go. This is true even though the Kootenay ores pay no less than \$30 a ton duty on lead exported to the States. Once the American smelters become dependent on Kootenay for the bulk of fluxing ores, we have only to remember who now occupies the presidential chair to-day to readily anticipate the removal of that duty (which removal has been clamored for already by the smelter interest, for two or three years past, and almost expected even under the Harrison administration.) With the added advantage of thirty dollars a ton—itsself a magnificent profit—Kootenay would have a most extraordinary boom. The following extract from the Victoria, B.C., *Colonist* of April 7th bears upon this point:—

"Charles G. Griffith, representative of the company operating smelters at Great Falls and East Helena, Montana, arrived in Nelson (Kootenay) on Friday. He has made several trips to this district as a sight-seer, but is now here on business. Heretofore the smelters, which he represents drew their supply of lead ores from the Cœur d'Alenes principally, but that supply is now being greatly reduced owing to the shutting down of several of the largest of the producing mines. The ores of the Slocan will be purchased from this time on, as they are the best ones obtainable for fluxing, owing to the high percentage of lead carried, one ton being equal to a ton and a half of concentrates from the Cœur d'Alenes mines. As an instance, Superintendent Fisher, of the Freddie Lee mine, recently took a sample of a 50-ton shipment, which gave a return of 127 ounces silver and 19 per cent. of lead! No other country produces so uniformly high grade." It may be mentioned that the "Freddie Lee" was the first mine opened in the Slocan district of the Kootenay country, and so late as last July.

This state of affairs explains the fact of the present extraordinary movement of mining men northward into Canada. It is reported that hundreds are crossing daily, although it is too soon to get into the mountains for prospecting, on account of the snow, and thousands are in the border cities waiting. A correspondent in Spokane (Wash.) of an Idaho mining paper says: "Here are prospective miners and prospectors of the great Slocan country, who have come from almost every State in the Union, and are using Spokane as a temporary halting place until tardily disappearing snows in that much loaded mineral country shall give them their opportunity, etc."

Altogether, the outlook is one of such activity as Canada never knew before in mining. An immense smelter, begun October, 1891, near completion. Kaslo and other cities of about a year's growth are springing up like magic. Railroads are building into the Kootenay country, and local branches are being built to tap the mines. Distant though it be, we should watch this development with great interest, and trust that the east will feel the good effects of the genuine prosperity promised our sister Province.

Yours respectfully,

W. H. LYNN.

VEINS carrying antimony, mispickel, copper, lead and silver have been opened at Barrie, county Frontenac, and active mining operations will probably be developed shortly.

THE following companies have been registered under the Foreign Companies Act. The Delath and Saint Paul Mining Co., B.C.; the Spokane and Great Northern Mining Co., B.C.; the Freddie Lee Mining Co., B.C.

THE "Talc Company of Frontenac and Hastings, Limited," have applied for incorporation. Canadian talc is believed to be fully equal in softness of fibre and floating qualities to that found in the United States, which country has hitherto supplied all the paper manufactories here. A mill is about to be erected at Kingston, which, it is expected, will be in full working order by the beginning of July.

JOSEPH HIGGINS, who was the pioneer of the axe, scythe, and tool trade of Canada, died at Cote St. Paul, near Montreal, a few days since. It may be said that he established Cote St. Paul. For years he employed 300 hands there. He was a friend as well as employer. Many of his men he set up in life. Numbers he was the means of rescuing from the curse of strong drink, says the *Witness*. He shared profits with his employees, and he lived to see those whom he benefited rivalling him in the business which he had made peculiarly his own. He was born in the Eastern Townships. Largely self-educated, he was a man of strong intellect, cheerful, an optimist, even in his old age. He loved fruit and bees, and he cultivated these in a beautiful garden, which for many years was his best delight. He leaves a wife and nine children.

Mining Matters.

THE Blackburn phosphate mines, in Templeton, Que., have been closed.

LARGE quantities of mica are being shipped from the Ruttan mines, Wilmur, Ont.

DRIFT gold has been discovered in the old bed of the Fraser River, near Yale, B. C.

THE New Campbelltown, N. S. coal mines have been purchased by Burchell Bros.

PREPARATIONS are being made for an active mining season in Lake of the Woods district.

THE placer gold mines on the Salmon and Pen d'Orielle rivers, B. C., are reported doing well.

THE Dominion Coal Co., of Winnipeg, is in difficulties, owing to the failure of Arthur G. Yates.

THE conditions for gold washing on the Fraser River, B. C., are unusually favorable just now.

THE Vancouver Island coal mines are unable to supply all the vessels waiting to load coal there.

A SYNDICATE has been formed for the purpose of developing the coal mines at Port Hood, N. S.

A PROPOSITION has been made to erect a smelter for reducing the ores of Trail Creek district, B. C.

REPORTS from Springhill show the coal mining prospects brighter there now than for some time.

A COMPANY has been formed to purchase the mica and phosphate properties in Ottawa. Capital, \$250,000.

THE Toronto Gold Mining Company has sent some fine specimens of gold-bearing quartz to the World's Fair.

A VEIN 540 feet wide, carrying free gold, has been found in the Maitland Mine in Tudor township, Hastings county.

THE Canada Coal and Railway Company now have some three hundred men and boys at work in the Joggins mines, N. S.

PURE antimony has lately been discovered in the Sudbury, Ont., district. The present price of antimony is \$240 per ton.

THE slate quarries at Westminster, B. C., are shipping considerable quantities of their slate to China as well as to California.

FIFTEEN and a half tons of copper, silver and nickel ore have been shipped to the World's Fair from the Sudbury (Ont.) district.

THE Otty Lake mines, North Burgess, Ont., have been purchased by Capt. R. C. Adams of Montreal, and some New York friends.

The Boston & Montana Mining and Milling Co. contemplate building sampling works at Kaslo, B. C., with a capacity of 100 tons a day.

ELLIOTT, LINE & WRIGHT are down about six feet on their nickel mine at Mission, B. C., and the prospects are looking encouraging.

THIRTY-ONE car loads of nickel matte went in one week recently from Sudbury to Constable Hook, N. J., for the United States Government's use.

IT is said that a Boston firm, Spence & Co., are going to open up the Albertite Coal Mine on the East Albert property near Edgett's Landing, N. B.

BURCHELL BROS. have purchased the New Campbellton coal mines on the Big Bras d'Or lakes, and will at once proceed to equip the mine and ship coal.

E. L. W. HASKETT SMITH, London, Eng., and H. Mason, mineralogist, propose on behalf of a company to open up the copper mine at Waugh River, N. S.

THE Trinidad Asphalt Co., of Toronto, who now do all their refining at Jersey City, in the U. S., contemplate erecting refining works somewhere in Canada.

POWERS & Co. have built a second Kelly sectional boiler for the Kootenay & Columbia Prospecting and Mining Co., to be used at the Stanley mine, Kaslo, B. C.

AN ore crusher is to be erected at the Maitland gold mine, in Tudor township, back of Belleville. The vein of quartz in this mine is said to be over 540 feet wide.

W. B. WALKER, of Union, B. C., has received an appointment as under-manager at a colliery in South Wales. He intends leaving in about a month.—*Victoria Colonist.*

F. J. LORDLY, book-keeper for the Londonderry Iron Company, N. S., has resigned, and is going to fill an important position in Halifax.

HENRY B. PRINCE, who recently died at Mount Uniacke, N. S., was one of the pioneers in Nova Scotia gold mining. It was he who worked the celebrated Ophir gold mine, which yielded over \$500,000 to its owners.

AN attempt is being made to develop the iron mines of Labrador. The great Krupp Gun Manufacturing Works at Essen, Germany, have sent an agent thither to ascertain if 500,000 tons a year can be secured to run their plant.

ACCORDING to the last report of the Newfoundland geological department, the prospects are bright for the early development of asbestos, the mining sections of the west part of the island being like the Quebec group, and some of the samples of asbestos fibre being very good.

W. P. HUSSEY, who, a year or so ago, bonded a coal area at Broad Cove, N. S., and paid \$9,000 deposit, has completed the purchase. The price of this and an adjoining area is said to have been \$100,000. It is said he has united his interest with that of the Inverness and Richmond Railway Company.

A PYRITICAL smelter, with a capacity for 300 tons and a guaranteed supply of 100 tons daily, will be erected this summer at Northport, B. C., ready for winter use. The plan involves the building of the Nelson & Fort Sheppard Railway's first branch line, which is to be fifteen miles in length, running from Northport to the Le Roi mine.

THE Boundary Creek district of B. C. seems to be capable of producing minerals of every description, from free milling gold quartz to lead, silver smelting ores. Last year there were shipments of grey copper and antimonial silver, carbonates and chlorides, sampling at the smelter 22 per cent. lead, 250 ozs. silver, and \$10 of gold per ton. The mining fraternity will have a busy time there this year.

THE Golden, B. C., *Eve* reports that Griffith & Galbraith have purchased for a London syndicate all the placer, hydraulic and other mining properties held by the Chinese companies on Wild Horse Creek. This is one of the most important mining transactions that have taken place in East Kootenay, and places the whole of the mining properties in Wild Horse Creek in the hands of a strong London syndicate. The company intend employing only white labor.

THE St. John *Saw* says the Queen's County coal mines of that province are under new management this spring and that the output will be much larger than last year. Two new companies are being formed—one called the N. B. Coal Co., and the other the Grand Lake Coal Co. Frank Todd, John J. Dunne, Charles A. Boardman, Jas. G. Stevens, jr., and Henry F. Todd are promoters of the former, which has a capital of \$300,000; and Joseph Bullock, Frederick A. Jones, William Murdoch, Samuel B. Folkins and Byron G. Taylor and others, are incorporating the other with capital stock of \$100,000, with head office at St. John.

THE incorporation is registered of the "Northern Graphite Company" by Frank Eiden Came, John Fraser Torrance, Harold English Stearns, Dealer Falconer Stearns, Wm. Starke, George Ritchie Starke and Robert Starke, all of Montreal, and James Eiden Came, of Boston, Mass. The capital will be \$95,000 and headquarters at Montreal. This company will establish works on the Rideau and work the plumbago mines in Elmsley township. Mr. Torrance has ordered the machinery in New York for the works. The company have obtained leases or options of purchase on desirable plumbago properties on both sides of the Rideau, and will have plenty of ore to keep them going. Their diamond drill will be kept at work testing the various deposits.

THE Vernon, B. C., *News* says:—The coal seam on Myers Creek, which is about seven feet thick and well suited for coking, is owned by D. C. Corbin, of Spokane Falls, who has surveyed a railway from Marcus which will carry the ores and coal from this district to the smelters in Spokane and elsewhere on the American side. Quartz mining is not going to be the only mining industry in the Boundary Creek sections, for in the gravel is a large quantity of coarse gold. With a view to developing this, there has been an application made to the Government for the lease of 700 acres to pursue hydraulic mining. Matters look hopeful for a town site on Boundary Creek. Montreal and Spokane capitalists are interested, and if the development of the mines warrant it they will erect a smelter. Another good coal seam which will help to maintain a smelter is that near the mouth of Rock Creek, on McConnell's property. The two shafts which have been sunk on this seam show it to be six feet wide and of good coking quality.

ORE will be shipped from the Redonda Island iron mine, B.C., this month.

REPORT comes from Sudbury of the discovery of a valuable new gold mine at Wahnapita Lake. Mr. Ryckman, M. P. of Hamilton, is interested in the discovery.

A PETITION has been laid before the Ontario Government asking for assistance in erecting a custom smelter near Sudbury, with a daily capacity of not less than 100 tons.

THE Danville, Que., slate quarries are to be operated on an extensive scale this summer. They have been bought by Feodor Boas and J. N. Greenshields of Montreal.

A RICH deposit of asbestiform serpentine 12 or 15 inches in width, lying beside a vein of pyrrhotite, has been opened on land near St. Stephen, N. B., says the *St. Croix Courier*. The property belongs to Hugh McKay.

ENGINEER DONKIN has arrived at Sydney, N. S., from Boston, with plans of the railway to Louisburg, and tenders are called for the grading and masonry of the branch between the International and Caledonia coal mines, belonging to the Dominion Coal Company.

REV. DR. BRYCE, of Winnipeg, is testing samples of clay found in a new pit near Estevan, Man., and is sending some to London, Eng. Taylor Bros., of Toronto, are making a test also, and if it is up to the mark, they will put in a large plant for making dry pressed bricks.

THE following are the officers of the Mining Society of Nova Scotia for the current year: H. S. Poole, President; J. E. Hardman, R. G. Leckie and D. McKeen, Vice-Presidents; T. R. Gue, Treasurer; H. McWylde, Secretary; and B. C. Wilson, Chas. Archibald, G. W. Stuart, G. Fraser, Chas. Fergie, D. W. Robb, R. H. Brown, A. E. Sjustedt and J. H. Austen, Members of Council.

A NEW ENGLAND syndicate have bought up the Broad Cove coal mines in Cape Breton, and will begin operations at once. These mines have been but little worked, owing to their distance from any good shipping point, but the Dominion Government has voted a subsidy of \$55,000 for a railway from the main line to Broad Cove, 32 miles, and the N. S. Government has offered a subsidy of \$3,200 a mile for the same work. The new company will sell part of their output in the States and part in Canada, and a line of steamers will be put on to carry the coal to Boston.

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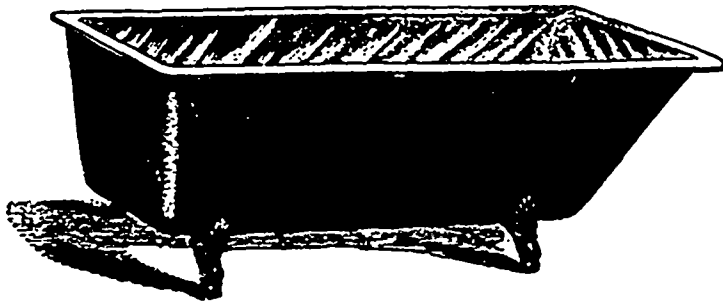
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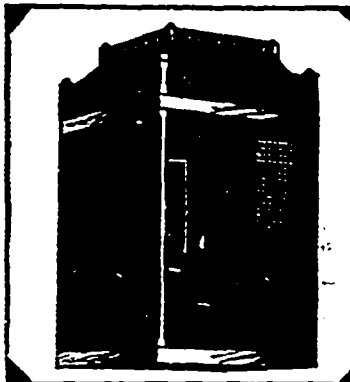
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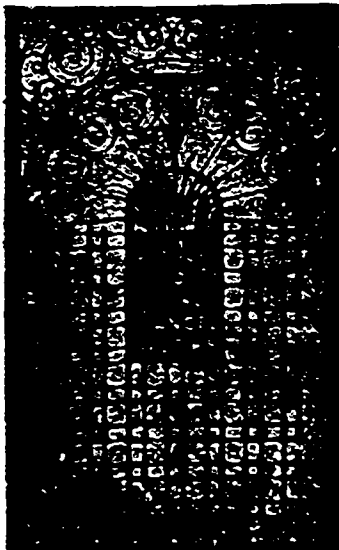


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A NEW FUEL SAVER.

Fuel saving and smoke consuming devices are by no means a novelty among engineers, and the mention of them sometimes brings an incredulous smile. The smoke consumers have failed because they have been devices of the mechanical kind, and soon cease to arrest the particles of smoke. Some remarkable tests have been made in Montreal, during the last month or two, with a compound which is at once a fuel saver and a smoke consumer. The preliminary tests were so satisfactory that Wm. Angus, the well-known paper manufacturer, decided to take an interest in the matter, and a company has been formed called the Coal Saving & Smoke Consuming Co., with offices at 454 and 456 St. Paul St. An exhaustive test was made on this compound in the large boot and shoe factory of Ames, Holden & Co. On the day before the test was made the engineer had used the usual average of 2,400 pounds of Wishart coal; and when the compound was applied, 1,900 pounds of screenings, costing half the price, were used. During the test of the compound the proprietors went out to look at the chimney, and were surprised to find, instead of the usual dense black column rolling skyward, a feathery path of thin grey smoke. When the furnace is examined with this compound in use, a white, incandescent heat is observed, and a comparatively thin layer of coal is spread over the furnace. It is claimed that, while the sprinkling of the coal with the compound gives no trouble, there is much less labor required in firing, owing to the more complete combustion of the coal. In short, a saving of 15 to 40 per cent. in fuel is guaranteed by this company after paying for the compound, and they undertake to prove their case or make no charge.

A HUNDRED years ago William Murdoch "illuminated his home with gas made in an iron kettle, and burnt at the end of an open iron tube."

An English authority furnishes a process for mottling iron, which is said to give a beautiful appearance to the various parts of engines and general machinery. The iron is to be case hardened, is first brightly polished, care being taken to remove all grease. The articles are then placed in an iron box and covered either with

bonedust or old leather that has been burned. The box is then placed in a brisk fire and allowed to remain about one hour, or until no doubt remains that all parts of the iron are heated to redness. The contents of the box are then dumped quickly into water. This operation requires great care, as the air must not strike the iron before it reaches the water. Special apparatus and practice are necessary to give the iron the desirable blue-gray mottled color, for if the air touch the iron it assumes a black or blue-black streaked hue accordingly as the experiment is more or less imperfect. After the case hardened iron is cooled it is varnished and the operation is complete.

COTTON-SEED OIL has taken an important place in the mechanic arts; it is an admirable lubricant. Heavy tools keep their edge and retain their temper better when served with it than with any other known lubricant. For cooling a heated bearing, or tempering steel, it is invaluable, and its use for such purposes is now become common among engineers.

THE following is recommended as a cement on glass, porcelain and iron: 120 grammes of gum arabic and 30 grammes of gum tragacanth are macerated separately in a little water; the latter mixture is agitated until a viscous emulsion is formed, when the gum arabic solution is added and the whole filtered through fine linen. With this liquid are then incorporated 120 grammes of glycerine, in which 2.5 grammes of oil of thyme have been dissolved. The volume is then made up to one litre by the addition of distilled water. This paste is said to possess remarkable adhesiveness, and to keep well in sealed flasks.

M. DE BOVER has brought out an ingenious system of magnetic pulleys. In the case of a chain pulley, the ordinary system with recesses wears the chain away rapidly, and in time the pitch of the chain and pulley do not correspond. M. de Bover uses a pulley with a deep recess containing a coil. This magnetizes the pulley in such a way that the links of the chain complete the magnetic circuit. The pulley thus resembles a plain cylinder with a groove. Alternate links lie flat, completing the circuit, while the others fit loosely into the groove. Such a chain pulley as this runs smoothly and gives no trouble even when worn. It can also be used for driving flat strips of steel, which might be used as loose belts.

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