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MONETARY TIMES PRINTING Co.

OF CANADA (LIMITED).

Per A. W. LAW, Sec.-Treas.

Toronto, June 1, 1893.

C. MEIGS, of Washington, D.C., suggests a method for counting the number of revolutions made per minute by the shafting used for the transmission of power to various machines. It is important to know the number of these revolutions in order that pulleys may be selected which conform well with the varying speed and power of the different machines. The process by which this may be accomplished is quite a simple one. To the extremity of the shaft in question should be fastened a pencil, either directly, or, if the diameter of the shaft does not give a circle sufficiently large for easy enumeration, with an intervening block. The revolution of the shaft will now cause the pencil to mark anything held in front of it, such as a piece of paper, and by moving the latter backward and forward a series of loops, intersecting each other, will be formed. In order now to obtain an accurate record, all that need be done is to time the period of contact and count the number of loops upon the paper.

It is stated that cast gears, with teeth just as they leave the sand, will run with less friction than those which have been rendered true and smooth by machinery. This is owing to the fact that in accurately cut teeth very little of the slush due to lubrication can find a place, whilst, on the other hand, in casting the pores and imperfect spots become a lodging place for oil and slush, thus forming a background for the gears to work upon easily for quite a long period.

A NEW electric derrick has just been put on the market. The electric hoist is attached directly to the derrick mast. The hoist consists of two side frames bolted to the mast, supporting two drums with the usual cone clutches, ratchet pawls, brakes and electric motor. A rheostat controls the speed. The arrangement of levers and pawls is the same as on all steam derricks. The winding drums are placed underneath the broom. A No. 12 railway motor is used, geared down to give a rope speed of from 45 to 70 feet per minute, lifting 3,000 or 8,500 pounds with a single rope.

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 hope our readers will freely correspond with advertisers, not forgetting, by the way, to mention THE CANADIAN ENGINEER as the medium.

THE *Nation's* Car and Locomotive Builder gives the following two ways of annealing steel: It can be heated to a dull red heat, covered with dry, warm sand and left to cool slowly, or heat and cover up in the forge fire and leave it there until the fire is out and all is cold. The other method is to heat the steel red hot; heat gradually, let it "soak," as the smiths say, until it is evenly heated, then remove from the fire and go to some dark corner. Let the steel cool until you lose sight of the dull red in the dark, then cool off in cold water. A good "dark place" may be made by throwing your coat over a barrel, leaving just room enough to look in at the iron. This method is called the "water anneal," and is based upon the theory that steel softens when cooled at a certain temperature.

THE change from the old to the new is in no way more clearly manifested than in the methods of lubricating the cylinders of locomotives. Formerly, a fireman had to crawl along the run-board, and try to oil the valves with the engine rocking from side to side, and, it may be, a strong cross-wind doing its utmost to hurl him from his slender foothold. But *nous avons changé tout cela*: looking at the increasing favor in which sight-feed lubricators are now held, it seems as if in a very short time no locomotive will be without them. Apart from the inconvenience, and sometimes the personal risk saved by using the sight-feed, there is

another advantage; the oil is delivered on the valve in an atomized form, like a spray, instead of in bulk, as by the old method. By those who have a prejudice against the sight feed lubricators this is sometimes lost sight of; but, nevertheless, it is a very real advantage.

THE tensile strength of nickel carbon is 90,000 lbs. per square inch, against 60,000 and 65,600 lbs. for the carbon steel in ordinary use. We may judge from these figures how valuable it may prove in connection with the machinery of the future. For example, it would save an enormous weight in the construction of boilers, which are at present made of 58,000 pounds tensile steel, and are often $1\frac{1}{2}$ inches in thickness. For if it is possible to use a material whose tensile strength is once and a half as much as that of the material in present use, boiler shells need only have two-thirds of that thickness; that is, instead of being $1\frac{1}{2}$ inches thick they need only be 1 inch.

THE reason why so many boilers are defective is that they are so often made from defective material or by unskilful workmen. Inferior material, or, in some cases, the formation of "fur" or sediment, cracks and blisters the inner plates. Sometimes a too great heaviness of the metal at the seams gives rise to the same condition. It is of the utmost importance to have the metal of a proper uniform thickness. Defectiveness in boilers arises also from carelessness in riveting; a rivet should completely fill the hole. Cold water should never be introduced into the legs when there is a very hot fire; it makes the sheets contract, and that in turn sometimes renders the tap and socket bolts leaky. The chief essentials for a reliable boiler are good material, good workmanship, and care in using.

AN arrangement has been made to enable a locomotive and train of cars to ascend a gradient easily, by means of keying a grooved drum upon the driving axle and winding once round the groove a stationary cable. With each revolution of the driving-wheels, the drum travels a full revolution over the cable; the latter lies in the centre of the track, and is secured in its position by guides. The assistance given by the turn of the cable round the drum, and the slight strain exercised at each end of the cable, are sufficient to give the driving wheels the necessary grip or bite on the rails to allow them to gain the full length of their circumference at each revolution. As the cable rests on the bed of the track while the drum passes over it, and at other times lies inactive, it is said, that this system reduces its wear and tear to a minimum.

THERE are many features connected with our mining laws in Canada that sadly need reform. The head of a prominent Ontario manufacturing firm, who had the advantage of seeing the wonderful development of California during the past generation, had a conversation with a representative of this journal, and cited more than one case to show how our cumbersome and inequitable mining laws obstruct legitimate enterprise. The fact is that thousands of square miles of mining lands in Canada have been locked up for years in the hands of a few capitalists, who are holding vast tracts on pure speculation, while in many cases the owners themselves are in ignorance of the exact whereabouts of the precious metals. They have simply read in the annual geological reports of the regions in which rich indications of minerals have been found, and have got hold of the properties simply to speculate and not to develop the mines. Such a policy is utterly destructive

of individual enterprise in mining, and our friend is quite justified in attributing to this cause the lack of progress that should be shown in our mining regions. More encouragement ought to be given to the work of the prospector, whose risk and whose hardships are often so great, and no company of capitalists should be allowed to hold lands undeveloped for more than a very short term of years. In Ontario there are a number of tracts of lime equal to whole counties, which have been kept for years untouched, simply because the speculating owners do not know the exact location of the minerals on the lands they have bought. By the laws of California such a state of things is impossible, and Ontario and our other provinces should take a leaf out of California's book.

THE idea of having church organs run by electric motors, instead of by water-power, is new in Canada, and the managing bodies of a number of Toronto churches have watched with interest an experiment made during the past month in the Westminster Presbyterian Church, in that city, by H. W. Petrie, who has patented a method of applying electric power to organs. The motor put in by Mr. Petrie has given such satisfaction, both as to economy and efficiency, that other church managers are going to dispense with water motors.

THE *Electrical Engineer*, of London, gives an account of the phosphorescent tubes which are being introduced in England for practical lighting in places where beauty is of more importance than a brilliant light. A generator of simple construction is used. The vacuum tube is made of a spiral thin glass tube, the ends of which are connected to two bulbs containing the electrodes. This uses about one watt per foot of tube lighted. The objection is that when these tubes are phosphoresced brilliantly, they become heated and the glass is apt to melt. The light is never brilliant enough to replace the ordinary incandescent lamps; but when a soft moonlight effect is desired, they produce very pleasing results. From 50,000 to 100,000 volts are required for the vacuum tubes; this is obtained by means of a transformer in oil. The tubes are lighted by induction effects, and are connected in series with condensers connected in parallel.

PEOPLE are naturally sceptical about flying machines. We give the following without comment from an exchange:—H. Phillips, of London, Eng., has invented a flying machine, which consists of a steam-engine in a boat, an aerial screw propeller, and a large wooden sail formed like a Venetian blind. An artificial current equal to the force of a gale blowing at the rate of thirty-five miles an hour, is produced by four hundred revolutions per minute of the propeller. This current, blown against the slats of the sail, produces a vacuum and plenum on the upper and lower surfaces respectively, and thus gives great lifting power. On a trial trip recently made, the machine, though only in an experimental stage, made a speed of twenty-eight miles per hour. W. E. McConnekin, an American electrician, is building an air ship on altogether new lines. The body of the peggassipede, as it is called, is shaped like a fish, the tail acting as a rudder. In the middle of the back there is a seat for the person wishing to ascend. The aeronaut does all the work required for flying by moving a pair of pedals, which are connected with a huge fan above. Any speed may be obtained, either slow or quick, by regulating the pace at which the pedals are moved.

To remove rust from bright steel surfaces make a mixture of 10 parts tin putty, 8 parts prepared buck's horn, and 25 of alcohol. Apply this on a piece of blotting paper.

A COMPOSITION for welding steel may be made of one part sal ammoniac and ten parts borax. These should be poured together, fused to clearness, cooled and reduced to powder.

THE hardness of steel tools may be much increased by making them white hot, dipping them repeatedly into sealing wax until cold, and finally touching them with oil of turpentine.

A GLASS factory at Liverpool has glass journal boxes for all its machinery, a glass floor, glass shingles on the roof and a smokestack 105 feet high, built wholly of glass bricks, each a foot square.

THE lineal expansion that takes place in iron exposed to heat amounts to .00008 inches for each foot raised 1 degree F. The expansive strain produced by about 12 degrees of heat is equal to that produced by a tension of about one ton per square inch of section.

THE collapse of one of the sky-scraping Chicago public buildings from a violent storm is not a surprise. The Western idea of enterprise, observes the *Manufacturers' Gazette*, is to make the largest show possible with the least capital. It is not a good idea in any line, but is especially objectionable for buildings whose downfall destroys human lives.

FIVE years ago there were 50 miles of electric street railways in the United States. To-day, out of 11,655 total miles of street railways, over 6,000 miles are operated by electricity. It is stated that the capital now invested in electric appliances of all kinds in the United States is \$80,000,000. By-the-way, the low price of horses for export from Canada is not so much due to the McKinley Bill as to the development of electric railways, through which change thousands of horses are being turned off every month.

DAVID URCH, of Portsmouth, is the inventor of what he calls the "pendulum propeller." It is intended to be affixed to the side of any vessel having on board a steam engine of any description, to give power in calm or light winds, or when entering or leaving port. A trial of the contrivance was made in Portsmouth harbor recently on the fishing schooner *Comet*, an engine of five-horse power being placed on her deck. The vessel steamed up and down the river, making three knots an hour. The machine is fastened to the vessel's side, well up to the plank-shear, with three bolts, and when not in use the screw can be swung to the level of the rail, or higher, by a small chain fastened to the lower portion of the "pendulum."

As the English people will not allow a tunnel under the English channel, a bridge across it is proposed. The depth of the channel is not great, and British and Continental engineers are now busying themselves in making plans for a bridge of steel to unite England and France. The structure is to be 200 feet high, wide enough for two railway tracks, and will cost, if built, at least \$163,750,000, or nearly twice as much as the proposed Nicaragua Canal. Speaking of this reminds us of another big scheme which will dwarf the seven wonders of the world—the building of a railway bridge across Behring Straits to join America and Asia. One engineer says it is quite feasible, as the Straits are shallow, and the islands numerous enough to make the scheme practicable.

THE use of cast iron in columns of buildings ought to be prohibited by law. It is treacherous and liable to sudden fracture from internal stresses developed in cooling. It possesses no ductility, and besides this, when on the point of rupture, shows no sign of distortion whatever. Wrought iron and steel are better in every way. It is known that blast furnace metal is often run into column moulds directly, while on the other hand, the very processes by which the former materials are made ensure a higher and more uniform quality of metal. Moreover, should either of these accidentally be called on to bear a strain beyond its proper strength, ample warning is given by its becoming distorted long before it gives way. Castings have been known to explode from the effects of internal cooling stresses before being subjected to any strain at all. The employment of cast iron may be permissible in large masses and in proper places, but it certainly ought not to be used as it is at present, in columns abutting one above the other, from the bottom to the top of high buildings.

THE method of hauling coal in the tunnels of coal mines by means of trucks drawn by horses or mules will soon be superseded by electric coal mining locomotives. The new method has already been successfully tried by the New Vancouver Coal and Land Co., of Nanaimo, B. C., who have just had the fourth electric locomotive turned out from the shops of the Canadian General Electric Co. at Peterboro. This style of engine develops a speed of 8 miles an hour on the average curves and grades of mines, and will haul a train of trucks loaded with 40 tons of coal. The requisites of such a locomotive are that it should be powerful, easily handled, compact, rigidly built, and develop its energy under the most adverse conditions. It must not stand higher than 5 feet from the rails, nor be wider than 3½ feet. The machine, says the *Peterboro Review*, in an interesting description of the engine just turned out, is a marvel of compact and powerful building. From his seat in front, the engineer or motor man can control the movement of the train, start, stop, reverse or hold with the powerful brake the entire train on a steep grade. The frame is two immense castings resting on four wheels coupled by connecting rods. The power is transmitted from the armature to the rear driving wheels by gears. Electric lamps at the front and rear brighten the way for the man at the wheel. To avoid the possibility of the locomotive being disabled, the entire mechanism for control has been made unusually heavy, the whole being covered by an iron roof of heavy plate, and the front suitably protected.

THE terrible disaster at Pontypridd, South Wales, again calls attention to the danger arising from the use of wooden frame works in mines. In this case there was no explosion of gas at all; but the underground woodwork seems to have caught fire through some accident, and then, owing to the dryness of the material, the conflagration spread rapidly, cutting off the men in distant workings from all chance of escape. The result was that over sixty miners lost their lives. Mr. Alrahand, speaking at a meeting close to the scene of the calamity, advocates the use of stone or iron instead of wood, and advises that all the "headings" should be covered with something of the same nature. Of course the hindrance to such an alteration would be the great increase of expense; but we are not sure that in the long run owners of collieries would not find this initial expense more than repaid by the lessened risks of serious fires.

THE City Engineer of Toronto has a scheme for improving the city water supply, which has, at least, the merit of being moderate in cost. He suggests the building of a tunnel from a point in the lake where the water is seventy feet deep, this tunnel to be run under the bay to the city. It will be about two and a-half miles long, and Mr. Jennings thinks it can be built for about \$800,000.

NARROW plates of steel wrapped together form a much stronger bar than a piece of solid metal considerably thicker. Should the outside layer be broken there are the inside ones remaining still intact, while in the latter case, should the external skin be ruptured, the whole piece gives way. The seams in these wrapped bars are hardly visible, only appearing when, owing to use of great force, there is a twist in the metal.

THE experiments of Tesla, the Italian electrician, tend to throw an altogether new light upon many fields of electrical science. He proves that under certain conditions it is quite possible for a man to receive unharmed a current of hundreds of thousands of volts. He holds that the lighting of the ordinary 100-volt lamp depends but very slightly upon the high resistance of carbon, and proves it by lighting up tubes and lamps through his body.

THERE appears to be a good deal of misconception existing as to the real nature of an oil engine, many people imagining that it is a small steam engine taking its steam from a specially constructed oil-fueled boiler. As a matter of fact, however, steam plays no part in it at all as a working factor; but finely-divided oil combined with a supply of air is introduced and ignited in the working cylinder. One advantage possessed by an oil engine over the better known gas engine, which it somewhat resembles, is that it may be used anywhere, without regard to whether a gas or water supply is available.

THE value of the mineral production of Canada during the last few years has been steadily increasing. The Geological Survey Department, at Ottawa, have published a report which shows that while in 1886 the value was (metallic) \$2,021,459, and (non-metallic) \$9,096,719, it was in 1892 (metallic) \$5,807,049, and (non-metallic) \$13,234,267. The value of the Sudbury nickel output in 1890 was \$933,232, while in 1892 it was \$3,513,339. Copper shows a value of \$354,000 in 1886, and of \$1,160,760 in 1891; but this declined in 1892 to \$821,589. Another metal which shows a decrease is gold. In 1886, it was \$1,330,442, whereas in 1892 it was only \$900,483.

IN parts of England there is a means employed for ventilating sewers and at the same time burning noxious gases, which is considered highly efficient. A Bunsen gas-burner heats to a high temperature a series of cast-iron cones over which the gases have to pass, and by contact with which they are destroyed. This plan having been objected to on account of the risk of gas explosions, another plan has been devised, which does away with the Bunsen burner. In this system, a safety furnace is placed in a ventilating shaft, surmounted by a lamp. The latter consists of a series of cylindrical rings; an intermediate ring divides the combustion chamber from the vertical air passages formed between the inner and outer rings of the furnace. To the outer ring the heat is conveyed by means of thick cast-iron webs, which form tiers of air channels through which the sewer gas passes.

THE reason why wetting coal should improve its combustion, is that it expands more, thus forming pores and cells which admit the air freely. The more uniform and porous the coal, the more accessible is it to oxygen. The combustion is thus more complete, and the quantity of smoke is lessened.

IT is a well known fact that the resistance of selenium is affected by light. Upon this is based the principle of an instrument for seeing over very great distances, called the klectroscope. By submitting a selenium cell successively to the various degrees of light reflected from the object under observation, a sort of pulsating current is produced, the pulsations of which correspond to the various waves of light reflected. These are transmitted over a line and reproduced at the receiving instrument, just as sounds are conveyed by the telephone.

IT was suggested by Faraday, that if we could discover the secret of the glow-worm and could concentrate rays of light, then we might have light in the middle of the night, without the waste caused by heating agents, such as gas, oil, or the electric carbons. Some experiments recently made by Tesla and by Papin seem to point to discoveries in the near future whereby it will be made possible to cause vibrations in the ether of the same nature as those produced by the sun. From this, it will be but a short step to the making of machinery for producing these vibrations by means of electricity, and it will be possible to make a steady glow of light appear in a room diffused like the light of the sun.

THE electrical process for manufacturing diamonds is as follows: About 200 grammes of a mixture of cast iron and carbonized sugar is placed in a crucible of carbon, resting in a bed of magnesia, the whole being placed in a specially designed furnace, heated by an electric arc to about 3,000° C. After five or six minutes' subjection to this intense heat, the crucible and its contents are plunged very quickly into cold water. The interior is thus subjected to high pressure, which solidifies the carbon. On dissolving the metal with acid a number of very small diamonds are found.

THE name of asbestos porcelain is given to a newly invented French material, possessing, it is asserted, some special advantages over ordinary porcelain. The fibres of asbestos are exceedingly fine. French measurements show their diameter to vary between .00016 and .0002 millimetres, an exceedingly fine powder being consequently obtainable from them. If it were possible to amalgamate such small particles without the addition of any foreign substance, it is evident, says the *Electrical World*, that a material could be obtained, though porous in nature, the pores of which would be so fine as to be hardly visible under the microscope. The substance in question is formed by pulverizing the asbestos, from which powder a paste is made by mixture with water, and this paste is kneaded, diluted with water, dried and kneaded again, and then moulded into the desired form. By heating the latter in a crucible to a temperature of 1700° C., a porcelain is obtained with a translucency comparable to that of ordinary porcelain; or, if heated for eighteen hours, at a temperature of 1200°, porous asbestos porcelain results, of a light yellow or white color, if the asbestos powder be washed with sulphuric acid. Tests made with vessels produced from this kind of porcelain show a decided superiority of the article in certain chemical uses.

THE first lady to adopt the profession of electrical engineer is Miss Fawcett, the English lady who recently passed with such high honors at Cambridge University. Her career will be followed with interest.

So far as we know, the first application of electricity to the opening and closing of canal locks is on a Canadian canal—the Beauharnois. Experiments are now being made at the Valleyfield locks, and if they are favorably reported on, the locks on the new Canadian Sault canal will be operated by electricity.

A NEW method of mixing alloys has been introduced, which consists in pouring the molten ingredients into a vessel in small streams, and then working in the vessel a plunger having numerous small holes, the mixing metals being forced through these holes at each stroke of the plunger.

A NEW method has been devised for lighting railway tunnels. The light of many electric lamps some yards above the rails is thrown by means of reflectors against the sides of the tunnel, where it is again reflected by means of burnished tin. The current is automatically turned on and off when the trains respectively enter and leave the tunnel.

SEVERAL improvements have been made in the kryptophone, the telephonic instrument invented some years ago. An extremely sensitive receiving diaphragm is so disposed as to respond to and transmit air vibrations produced by any noise to a distant telephone, an alarm bell being provided at the receiving station to draw the attention of the attendant. When this receiving diaphragm, it is said, is immersed in water, the pulsations of a steamboat some miles distant are readily discernible.

A MACHINE for baking bricks by electricity has been invented. It consists of a table provided with iron brick moulds, joined together like pigeon-holes, to which the electric current is applied. Each mould possesses a cover so adjusted as to follow the brick as it shrinks, and to turn off the current automatically at the proper time. It is claimed that by this electric process bricks are baked harder and of better shape than by the ordinary firing operations, and that it only requires three hours and a half to carry through.

THE opening of direct steamship communication between Canada and Japan has not only proved successful in the matter of passenger traffic and general freight, but has incidentally been the means of opening up trade in several lines of Canadian manufacture, which have been profitably exported to both China and Japan. The establishment of the new line of steamers from British Columbia to Australia, ought to open up a still larger field for the export of Canadian manufactures, because for years our American neighbors have done a trade there, and the Australian colonies have been for a long time desirous of the direct steamship communication, which alone could render such a trade profitable and permanent.

THE latest addition to the equipment of some of the English police is a pocket telephone. It is said to be light and handy, and consists of a combined ear and mouthpiece. It is to be used chiefly in connection with the fire lamps placed at various intervals along the streets. Instead of breaking the pane of glass, as most people have to do in order to ring the alarm, the policeman has merely to open the door with his key, place a connecting pin into a socket provided for it, and be in direct communication with the fire brigade.

It is then easy to suggest what appliances are likely to be most useful in the case of such a conflagration as the one announced. Besides their usefulness in the event of fire, these pocket telephones may be used for other ends equally important, such as in cases of robbery or murder, when their possessors may easily signal for help, or for further instructions.

WE understand that the experiments now being made on the Beauharnois canal in opening and closing the canal locks by electricity are successful. It is altogether probable, therefore, that the new system of electrically opening and closing locks will be applied on the other Canadian canals at an early date.

THOS. A. EDISON has patented a method of obtaining a new mechanical movement by the aid of magnetism, and by which it is possible to transmit large powers at high velocities without the excessive noise incident to the use of toothed gearing. This is done by employing smooth-faced iron pulleys or wheels, which are made strongly magnetic by suitable windings connected in circuit with some source of electric energy. There are also endless belts, ropes, and chains, which are either magnetic themselves or carry iron bars forming armatures to close the magnetic circles at the pulleys. These endless belts are attracted strongly to the faces of the pulleys so as to increase the adhesion and to transmit the power without slip.

THE Tanssig system of smelting and casting metals in exhausted chambers is claimed to produce by each process and within fifteen minutes, 1,000 cwt. of finished cast metal, bronze iron, steel, copper, brass, zinc, platinum, gold, or silver. The process is effected by means of flat-shaped metal electroids in an exhausted furnace, large moulds being set up outside the furnace, and exhausted by one process simultaneously with the exhaustion of the furnace. The electric current acts by conduction through the metal which is to be melted. By this process all contamination of the metal by carbon is avoided. As coal slack is practically absent, there is hardly any refuse; nor is there any oxidation or formation of air bubbles. As the casting forms are without air, a wonderfully fine and close casting is possible even in objects of delicate shape or very small diameter. It is said that on this system the consumption of coal is reduced 50 per cent.

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. Such is the opinion of THE CANADIAN ENGINEER.

WE feel under a debt of gratitude to our contemporaries for their generous references to THE CANADIAN ENGINEER. It is not often that a new paper has been so kindly and warmly received, and we hope to deserve the good opinions our *confreres* have been so kind as to express. The many new subscribers we are receiving are equally warm in their expressions towards this paper, and our earnest endeavor will be to deserve the confidence which has been so quickly and so unstintedly placed in us. The paper will be found not to be without faults, and we shall take it as a favor from any reader who will point out a defect or make a suggestion for future improvement.

It is very much to be regretted that with all the suspicious circumstances surrounding the Government canal works in Montreal, the Government should lay themselves open to the charge of cruel neglect in the pay of the men. The families of many of their workmen are said to be bordering on a state of starvation, caused by not having received their pay for the last three months. The fact of the suspension of Mr. Kennedy is no excuse whatever for keeping these workmen out of their well-earned pay.

THE work on the Chignecto, N.S., marine railway has been stopped for some time owing to the depletion of funds necessary for construction work. The company hoped to raise by the 1st July the extra £300,000 necessary to finish the work, but great difficulties are in the way owing to the condition of the money market at home. Another difficulty is the pronounced opinion of many captains and vessel-owners that the strain upon a heavily laden vessel when lifted out of the water on these immense trucks will be greater than can be safely borne. Friends of the undertaking are confident that as soon as money becomes easier, the work will be successfully carried out.

THE fact is now becoming more recognized that the rapidity with which the electrical energy of the Hertz Resonator is dissipated is increased by the magnetism and resistance of the conducting wire. The dissipation may take place either by transformation into heat in the conducting wire, or by radiation across the dielectric medium. The transformation into heat, which perhaps is more probably the cause, takes place in the thin superficial layer along which the electric currents flow. To ascertain the thickness of this layer, V. Bjercknes covered the iron wire with thicker and thicker electrolytic layers of copper, and found that the deflections of the electrometer increased as the value of the deflections which took place in the case of the solid copper wire; when the layer had a thickness of 0.01 mm., the difference between the wires disappeared. He next covered the copper wire with electrolytic layers of iron, and even a layer 0.0002 mm. thick had an appreciable effect. The value which the deflections had in the case of the solid iron wire was very soon approached, and when the layer exceeded 0.003 mm. in thickness, the difference totally disappeared. Mr. Bjercknes concluded, therefore, that the currents penetrate less deeply into the magnetic than into the non-magnetic metals. The part taken by magnetism in the dissipation of electric energy is thus explained. The currents are confined to a thin layer and encounter greater resistance; consequently, there is a greater generation of heat.

TEMPERING STEEL BY ELECTRICITY.

When a strong current of electricity is passed through an electrolyte, the negative electrode being a fine wire, and the positive electrode a conductor of considerable surface, a luminous sheath is formed around the negative electrode, and, at the same time, the heat developed is very great. By its means a very intense heat may be applied to any particular point, while, on account of the rapid disengagement of this heat, the surrounding parts remain cold. This principle has been applied to a process of tempering and hardening steel. The outside of a bar of steel has been heated by this means to a bright red heat, and then, the current having been stopped, the cold electrolyte was allowed to come in contact with the hot steel. The outside of the steel can thus be hardened to any degree, while the inside, not having been heated very greatly, remains soft and tough.

STEAM ENGINE JACKETS.

The Research Committee appointed by the Institution of Mechanical Engineers of England, for the purpose of deciding upon the value of steam jackets, have just presented the second part of their report. From this it appears that the expenditure of a quantity of steam in a very large jacket causes the saving of a greater quantity in the cylinder. An important factor in such an investigation as this is the exact ratio between the two quantities. One experiment showed that for every 1.13 pounds of steam expended in the jackets there are 5.82 pounds less feed water passed through the cylinder, the nett saving thus being 4.69 pounds. The smaller the cylinder, the greater is the usual gain from the use of a jacket; for a smaller cylinder presents a larger surface of jacket for a given weight of steam passing through it than a large cylinder does. In the test of a triple expansion condensing vertical inverted engine having cylinders 5, 8, and 12 inches in diameter, and 10, 12 and 15-inch stroke, the engine being on three uncoupled cranks, it was shown that without the jacket 16.42 pounds of feed water were recorded for each horse power per hour; while, with the jacket, only 13.56 pounds were recorded. In this case, 64.7 per cent. of the internal surface of a high pressure cylinder was jacketed, 67.1 per cent. of that of the intermediate, and 75.2 per cent. of that of the low pressure cylinder. The committee found that engineers were practically unanimous as to the advantage and economy of using a steam jacket, but were divided in opinion as to how far the principle ought to be carried. One speaker mentioned that he had known instances in which the required power had not been developed until the pistons had been arranged to take steam inside. The piston rods should also be jacketed, he said, as, by passing from the cylinder to the outside air, they must necessarily carry off and waste a considerable amount of heat. The speaker also stated that he knew of an engine the power of which had been increased from 41½ horse power to 49½ horse power in five minutes by putting the steam jacket into use.

TESLA holds the opinion that the earth is a great insulated globe filled with electricity, or the capability of electrical vibration. The only problem is to awaken this electricity, to shake the earth so that this immense force may be set working. For instance, there is enough latent power in Niagara Falls to do this easily. How to utilise it, how available to store it when obtained, is the question.

WE have pleasure in presenting herewith a portrait of a gentleman well known among machinery men in almost every province in Canada—James Clarke—who was several years connected with the extensive machine tool firm of John Bertram & Sons, Dundas, but now superintendent of the Canadian Machinery Hall at the World's Fair, Chicago. Mr. Clarke was born in Prince Edward Island in 1845, and moved to Ontario when he was nine years old. After spending three years on his father's farm, he started at the age of eighteen to learn the business of machinist and engineer with Mr. Munson, the oil well owner of Oil Springs. He soon showed his aptitude for mechanical work, and after working six years at Oil Springs, went to Cobourg with Mr. Munson, where he was put in charge of the dredging and harbor works. He after-

ing a 570 feet well, alone and unaided, to building a pleasure yacht, and fitting her with engines and boilers. When the Colonial and Indian Exhibition was held in London, in 1886, it was found that the exhibits of Canadian machinery were going to be of great variety and extent, and it was a question who could be got to superintend all this machinery in a practical manner. The applications for this post reached the remarkable number of four thousand, and out of these Mr. Clarke was the fortunate man. His selection was well judged and was never regretted by either the Government or the exhibitors. The great Canadian machinery hall was one of the features of this wonderful exhibition of colonial products and manufactures, and in all the six months during which this machinery was in constant operation, not a single accident or breakdown occurred.



MR. JAMES CLARKE.

wards started to learn marine engineering, and obtained a certificate as a marine engineer. After being on the water for about ten years, he returned to Cobourg and took charge of the woodworking department of the Crossen Car Works. From this position he was appointed Superintendent of Public Works at Cobourg, where he acquitted himself with great credit. Although offered an increased salary, to remain, he was induced to take charge of the mechanical works of the Cobourg, Peterborough and Marmora Railway. Mr. Clarke, in all his very varied experience, sought to make himself acquainted with every department of mechanical work, and there was nothing he attempted in the mechanical line that he did not accomplish, from sink-

This was not the only satisfactory feature of the appointment, for there was scarcely a firm who did not effect some sales of machinery through Mr. Clarke's judicious explanations, his thorough understanding of the work and his constant attention to business. Indeed, many of the Canadian exhibitors at the Colonial Exhibition laid the foundations there of a foreign trade which has gone on increasing to this day, and when the time came for preparing to open the World's Fair there was a general demand among Canadian exhibitors that Mr. Clarke and no one else should have charge of the machinery. Though Mr. Clarke in no way sought the appointment, but in fact hesitated a long time before accepting it, he yielded to the solicitations of so many

exhibitors, and hence we find him in charge of the Canadian machinery at the Chicago show. James Clarke is not only gifted with an instinctive knowledge of mechanical work, but what makes his knowledge valued or appreciated by his friends, he is absolutely without egotism or pomposity. We are sure he will do credit to his important position.

THE MODEL ELECTRIC RAILWAY.

The *Street Railway Journal* contains, under the above title, an article by W. Y. Soper. Mr. Soper is a member of the firm of Ahearn & Soper, of Ottawa, and his essay is so practical and pointed that we give it for the benefit of interested readers:—

Given a good roadbed, modern cars equipped with efficient electrical apparatus and affording rapid transit, is anything additional necessary to constitute a model electric street railway? These elements are important, but they are only the substructure upon which the system itself is built, and as the latter in all its visible details of daily operation is what most nearly concerns the travelling public to whom we look for patronage, it should receive our constant consideration and untiring attention.

The horse car was called the poor man's carriage, and the manner in which some horse roads were operated seemed to indicate the opinion of the management that for the poor man anything at all on wheels was good enough.

The advent of the electric system has changed all this.

In the modern electric car, elegantly upholstered, spacious, comfortably heated in winter, and electrically lighted at night, the poor man has found a carriage more luxurious than any he ever envied; while the rich man, knowing a good thing when he sees it, has disposed of his horses, and joins his neighbor in enjoying the advantages of electric rapid transit.

Having won the patronage of all classes of the public, it should be the aim of the street railway company to merit and retain that patronage.

In the oft quoted recipe for making hare soup the first mentioned qualification is to catch your hare. In the efficient management of a model electric railway the first necessity is to secure your superintendent, and, like the hare, he should be a good one. He should be able to handle employees intelligently and with firmness, and to command their respect and fealty without familiarity. He should be wide awake to the hourly and oft changing demands of the traffic, and should weigh carefully all suggestions from any source tending towards the improvement of the service.

Next to the superintendent, and as regards the operation of outside service, of equal importance, is an active, wide awake inspector, whose duty it should be to see that the details described further on in this article are strictly adhered to. The inspector should be always in the field, that is, on and off the cars here and there and everywhere, and, if he is the right man, he will find his time fully occupied. He will quickly regulate the service of the cars, when by accident or otherwise they may have become irregular and out of schedule time. He will be on hand at the closing hours of theatres (when conductors and motormen, who, although uniformed, are human, and are anxious to reach the car house) to see that accommodation is provided for passengers over the company's various routes. He will know of the departure and arrival of excursion trains,

and will miss none of them. He will do everything that the management look to him to accomplish, and will think of and execute much more. Such men will keep the system up to the high standard demanded from electric railways of to-day, and that has been attained by at least a few of them.

Some of the principal features of these railways the writer proposes to describe.

The cars are vestibuled, and are the most modern and elegant that can be procured, and are always new—that is, they look new. They are put through the paint shop every spring, and emerge resplendent in renewed gilt lettering and varnish. They attract attention and excite comment, comment from those to whom we look for our daily nickels, and who are quick to appreciate an evident desire to furnish them with only the best. So much for the exterior. The interior is not disappointing. Finished in polished cherry, with heavy polished brass trimming, and upholstered in Wilton carpet, they are, in truth, parlor cars. Four bevelled plate glass mirrors are in every car, two in each end (one's own reflection is never uninteresting to one's self). At one end of each car, over the door, is a small clock, kept always in correct time by the inspector. These clocks represent only a small outlay by the company, and are greatly appreciated by the travelling public. They form one of the little features that "catch." Upon the car floor is a strip of matting made to order and fitting neatly. The feeling of comfort to passengers afforded by this addition to the equipment of the cars can be appreciated only by experience. Electric heaters are in all closed cars, and are in circuit at all times that the temperature renders their use necessary. The cars are not permitted to become uncomfortable. Previous to the adoption of electric heaters the company had used coal stoves, with their necessarily attendant evils of being too warm upon some days and not warm enough upon others; fires occasionally out during hours of running, and relighted to the annoyance and half suffocation by smoke of the passengers; ashes strewn around the car floor, and the conductor's hands and clothes always untidy from acting as fireman. "But the cost of current!" exclaims the economical management. True, heat cannot be obtained without expenditure; and it may, although the writer doubts it, cost more to heat electrically than by coal; but you are not carrying imperishable inanimate produce, you are carrying intelligent, discriminating, and, if imposed upon, resentful, human beings, and the question is, do you carry a greater number of passengers by adopting such improvements as they have a reasonable right to expect? Solomon never saw an electric car; knew nothing about electric heaters, economical or otherwise, but he apparently had in mind the fact that even economy may be overdone to the detriment of receipts, when he said: "There is that scattereth and yet increaseth; and there is that withholdeth more than is meet, but it tendeth to poverty." Furnish your patrons with a miserable service, not sufficiently equipped in its minor points—in other words, withhold the sprats, and you will soon find that you catch few mackerel.

A broom is carried on each car, and it is the conductor's duty to see that the steps and platforms are at all times cleanly swept. No torn papers or scraps of any kind are allowed to remain upon the floor of the car. The upholstering is frequently beaten in order that no dust may accumulate, and that it may look fresh and clean. The windows are clean—not a

smutched kind of cleanliness, but polished and bright — as are also the woodwork, the fare register, the glass clock front, the incandescent lamps and the mirrors. All car cleaning is done by women at the car house; experience has shown that men can never be expert in such work. They neglect the corners. Cleanliness is said to be next to godliness. There may be very little of the latter in street railway management; there cannot be too much of the former.

The conductors and motormen are neatly uniformed, part of their outfit consisting of clean white collars and black ties, these two details forming a pleasant contrast to the soiled linen that is too frequently seen upon the employes of some roads. The conductors are taught that, although they are in full charge of the cars while running, they do not own the passengers. This, to the passenger, somewhat important fact, is occasionally forgotten by some conductors. They must be civil, polite, attentive, patient and firm. Difficulty with a passenger may arise in which the passenger is entirely to blame. The conductor will naturally feel like "having it in for him the next time." His instructions are to forget the occurrence, and to treat the offender with the same courtesy as is due to any passenger, when again he rides. The conductors are instructed to avoid familiarity with passengers. In small cities, where acquaintances are many, this rule is especially necessary. The habit is easily acquired and is offensive generally. Unnecessary conversation between conductors and motormen is prohibited. Conductors assist ladies and children on and off the cars, not in a perfunctory step-lively-push-up manner, but courteously. Smoking on any part of the closed cars is prohibited. The rule, at first, was difficult of enforcement, and the company was assured that business would suffer. The contrary has been the fact, and ladies are no longer obliged to force their way through a group of smokers on the rear platform.

Dogs are strictly tabooed. The one passenger with the dear little dog, you know, is offended. The other twenty passengers without dogs are pleased.

The motorman acknowledges with a nod all signals from persons desiring to take the car. This shows those waiting that they are seen, and prevents the nervousness naturally experienced when no indication is given that the car will stop.

The writer has endeavored to describe, as briefly as possible, such details of a successful street railway as are constantly under the public eye, and which, therefore, tend to secure the object aimed at by the companies, viz., a profitable traffic. It is only these visible details that the travelling public know or care anything about. They know little and care less about the power house—the very heart of the system—but they do know cleanliness from dirt, courtesy from incivility, heat from cold, and will freely and willingly shower their pennies upon the company that makes an effort to provide only the best.

ALUMINUM.

Aluminum has been pronounced to be an intermediate between the base and the noble metals, and it has many features that seem anomalous. Its weight is one-third that of iron, yet its tensile strength is twelve tons to the inch; it is only one-seventh the weight of gold, yet it is nearly as ductile. After being rolled or hammered, it is nearly as hard as iron, yet when cast it is as soft as silver. Neither air nor water suffices for

its oxidation, and even nitric or sulphuric acid attacks it but slowly. Even when exposed to the fumes of sulphuretted hydrogen, its lustre remains undimmed. In this consists the great superiority of aluminum to silver; and besides this, it has the advantages of greater strength and lightness. The acids of the body have no effect upon it whatever, and this renders it peculiarly adapted for surgical instruments. It conducts electricity eight times better than iron. The ease with which it conducts heat renders it wonderfully useful for making cooking utensils; moreover, even if corrosion did take place, the salts produced would be harmless. It has been found that even as little as one-tenth of one per cent. of aluminum added to iron increases the tensile strength from twenty to fifty per cent. and renders it less liable to oxidation. Aluminum bronze, owing to its freedom from flaws and its uniform strength, will probably be the gun-metal of the future, and its use will render more rare those burstings of guns which have been in the past so fatal. For all objects requiring a combination of lightness with great strength, aluminum will probably be used more and more.

FATIGUE IN IRON.

There appears to be little doubt, says the *Locomotive Engineer*, that iron undergoes what is styled "fatigue." There is a bending or a lengthening and shortening action going on even when the change is too minute for measurement. This movement of the metal causes molecular changes which reduce the adhesion of the particles, thereby making the metal weaker. Every observing person who has had much to do with iron must have noticed breakages when what had once been good metal had become so brittle and crystalline as to be unfit to sustain a reasonable load. Any long continued strain, or constantly repeated jarring, tends to induce a molecular change very detrimental to the metal's quality of strength. It is stated that the strength may be restored to iron which has been weakened by use, by merely having the metal re-worked.

HIGH PRESSURE.

The present tendency in engineering circles is to increase pressure in the boiler rather than to decrease it. Engines, it has been found, can be worked with a comparatively smaller consumption of steam if run at a high pressure. The exact ratio of gain according to increase of pressure has not yet been ascertained reliably. But it is believed that in a compound engine with an increased pressure of from say 100 pounds to 150 pounds, there is at least 10 per cent., or possibly 15 per cent., saving; and between a compound engine running at 100 pounds, and a triple-expansion engine running at 150 pounds, both suitably proportioned and loaded, there is a similar gain, due to the engine working under greater expansion and higher pressure. In order to withstand the increased strain attendant upon the employment of high pressure, the boilers and steam-piping should be made extra strong. A better class of packing and more stable joints must also be provided. The plant must be watched with greater care than would be necessary for low-pressure engines. As an offset to the advantages of high-pressure working, may be mentioned the increased wear and tear, and depreciation and the loss of fuel. We are not sure, on the whole, whether the losses entailed by a high-pressure system do not counterbalance its gains.

FLY-WHEELS.

In connection with a fly-wheel there are many points which render it one of the most important features of a thoroughly well-balanced steam-engine. The necessity for its use arises from the irregularity of the crank-action, upon which most steam-engines depend for the transformation of reciprocatory into rotatory motion; but besides its character of being a regulator of motion, it is also a reservoir of power, useful when variations occur in the load an engine has to carry. In some cases, also, it is used in conjunction with a belt or band, which acts as a sort of pulley, as a means of communicating power.

For a fly-wheel to be truly proportioned, it should be impossible to detect any variation in its speed, or in the motion of the engine. This being equivalent to uniformity of power, the dimensions of the fly-wheel must be determined by the nature of the work to be accomplished.

Various formulæ are employed by engine builders to assist them in judging the proper size and weight of fly-wheels. For instance, the Buckeye Engine Company, in order to arrive at the weight of rim per horse-power, divides 6,500,000 by the diameter of the wheel in feet and by the number of revolutions per minute; e.g., an engine making 100 turns per minute would require for a 13 foot wheel $6,500,000 \div (13 \times 10,000) = 50$ pounds per horse-power in the rim. This is for automatic engines; but for those of the throttling type, the Buckeye Company would substitute 5,000,000 for the former figure. If a small wheel is required, equal in efficiency to a large one, its weight should be universally as the square of the diameter to centre of rim thickness, as compared with that of the larger wheel. For example, if the diameter of the large wheel to centre of rim is 18 feet, and that of the small wheel 14 feet, then the weight of the small wheel should be as $18 \times 18 = 324$ is to $14 \times 14 = 196$, compared with the large one.

In order to have the least amount of friction, the best position for a fly-wheel is as near as possible to the crank.

To produce a full effect, they should be accurately centered and balanced; and the speed at which they run should be also duly supervised. It is difficult to lay down any definite rule on this point. The true proportion must be determined by the nature of the work in hand, the length of stroke of the engine, and the accurate balance of the rotating parts. In cases where the speed has to be decreased or increased suddenly, a very heavy fly-wheel, or one rotating at very high speed, should be avoided.

BOILERS.

The causes of deterioration in boilers are varied. In some districts, the feed-water contains an excessive quantity of salt, or of acid; or it is taken from copper mines or artesian wells. All these are detrimental to the good condition of a boiler. The feed-water should be the best obtainable, and many explosions have been caused by negligence in this respect. Boilers should never be set in damp places, for external corrosion is injurious. The introduction of a fresh supply of water is, owing to the rapid generation of gases and the sudden excess of pressure, another fruitful cause of explosions. For the same reason an explosion sometimes takes place when the engineer, discovering low water, raises the safety-valve and starts the engine; it relieves

the pressure of steam, causes the water to rise and strike the heated parts, and steam in consequence is generated over-quickly.

It would materially decrease the risk of explosions if the following points were always observed:—

There should at all times be a sufficient quantity of water.

There should never be a higher pressure of steam than can be helped; the pressure allowed by the inspector should under no circumstances be exceeded.

The boiler should be allowed to cool down before being refilled.

Before starting the fire, it is well to try the water gauges and to see that the water is at proper level in the glass gauge.

Glass gauges and gauge cocks should be kept in perfect order; the openings should never be allowed to stop up. Otherwise, owing to the quantity of scale and sediment, one is apt to be deceived as to the real water-level.

The safety-valve should be kept in good working order, be lifted and oiled at short intervals, to prevent corrosion, and occasionally it should be ground in.

If the steam gauge and safety-valve are found not to correspond, the former should be tested, and if defective, repaired without delay.

The steam gauge should not be exposed to much heat. The pipe should be so arranged that the condensed water will act on the gauge and not the steam direct. There should be a small cock to prevent the freezing of condensed water in cold weather.

The boiler should be cleaned often, and after each cleaning, it should be examined internally so that any defectiveness in the braces, fire-box, crown-sheet, or other part should be discovered and rectified at once.

Water should not be put into a boiler at low temperature. It is best to use feed water heaters or injectors, which, in the long run, are economical, and add to the boiler's lease of life. The feed-pumps should be kept in good order.

A stop-valve should be placed between the check-valve and the boiler, so that the former may be easily examined at any time.

Finally, the best safeguard against the risk of an explosion is to take great care in keeping every part of the boiler thoroughly clean and in good working order.

ELECTRICITY AND STEAM.

It seems a curious anomaly that at the very time that the application of electricity to all the purposes of civilization has shown such an extraordinary development, the demand for steam-engines has increased in almost the same proportion. People used to think, because electricity was coming into use as a motive force, that steam would go out of fashion. The event has proved far otherwise. It is true that there are ten hundred electric cars running now to every one running a few years ago; but here comes in the question, where does the electric force itself come from? In a few exceptional cases it is generated by the power of falling water or by that of chemical mixtures; but for all practical purposes it may be said to be steam converted into electricity. The same holds good when we consider electricity as an illuminant. The light is formed by the passing of an electric current between two poles; but the current itself, traced back to its source, is found to spring from an engine worked by steam. In no way has steam-power become obsolete; it has merely taken in a partner.

THE DIPPING PROCESS IN PAINTING.

We would call the attention of certain manufacturers to a system or method of applying paint and varnish, which, though far from being a novel idea, has only recently been brought to a high state of perfection. We refer to a dipping process, whereby the article to be painted or varnished is immersed in a tank of color or varnish instead of having the material brushed on. It is a mistaken idea to suppose that paint when applied by the brush is rubbed into the fibre of the wood, as paint on iron work is just as durable as a like material on wood, and yet no one can say that the paint is rubbed into the iron. But the great obstacles in the way of successful dipping have been that the color, usually of a heavy nature, soon settles at the bottom of the tanks and becomes hard and useless, and that it al-

largest manufacturing concerns in Canada, the result being that 50 sashes were painted in exactly 15 minutes by one boy, and the work done excelled by far that of a man painting but one hundred of the same articles as a day's work.

The firm to whom is due the credit of introducing and perfecting this method is that of John M. French & Co., paint and varnish manufacturers, Toronto, who control all the patents pertaining to the system, and who give us to understand that they ask no premium for its introduction. It is creditable to Canadian skill that the first successful appliances of this kind ever introduced have emanated from this Dominion, and we believe arrangements are to be made by which this important invention will be manufactured in the principal foreign countries in which patents have been secured.



THE SILVER KING MINE, RECENTLY SOLD FOR \$1,800,000

most invariably runs, and what painters term "fat edges" are left on the article painted.

By use of a suitable system, and patent tanks and appliances, as well as by preparing the color and varnish in a proper way, these difficulties have been completely overcome, and the large manufacturers throughout the country have now almost entirely adopted the dipping process, which effects a saving of labor alone of from fifty to one hundred per cent. on the cost of painting and varnishing. Take, for instance, the painting of wagon wheels. It is a smart mechanic who will give more than ten moderately-sized wheels one coat of paint in one hour; whereas the same work, and with much better results, can be accomplished by the new system in about as many minutes.

An interesting experiment in priming windowsashes was made a few days ago at the factory of one of the

THE above photo-engraving shows the site of the celebrated "Silver King" Mine, recently bought by a Scottish syndicate for \$1,800,000. The engraving shows the mine as it appeared last year. Not much to look at, but we know that hard-headed Scotchmen are not likely to throw \$1,800,000 into a hole in the ground, and before this time next year there will be a thriving town on or near the site of this mine. Rather late in the day, Canadians are waking up to some conception of the vast mineral wealth of British Columbia; and prospectors, settlers, and investors are pouring in there by thousands, especially from the United States. Whoever lives to see the dawn of the year 1900, will see British Columbia and Vancouver Island the seat of commanding power, wealth and enterprise.

BELTING.

When a belt is running on a rounded pulley at a very high speed, centrifugal force tends to cause its edge to leave the pulley, owing to the strain upon the centre of the belt acting as a sort of natural lever. If, however, the belt be made pliable and very thin, and the pulley be nearly flat, the centrifugal force has a considerably smaller effect and the belt hugs its work. If more power be needed a second or a third belt should be added. It has been found that a second belt gives a gain of 100 per cent., and a third one a gain of about 170 per cent. By compounding the belts all the power of the engine is utilized, without any loss from slip. Another form of belt very useful for high speeds and great power is what is known as the arched-chain belt. It is made with a flexible centre, and is thinner here than at the edges. A better fit to the shape of the pulley is thus obtained. A chain belt has not so much tensile strength as a double or single leather belt when under a dead strain; but it runs with such a steady swing that for lifting power it will do more work than either.

ONTARIO'S NORTHLAND.

Editor CANADIAN ENGINEER:

SIR.—We are so apt to fancy that we have seen all Ontario before we cross the parallel of 46°, that a few words concerning the region beyond may possibly be of interest to your readers.

The height of land dividing from Hudson's Bay is from 800 to 2,000 feet above sea level, and is a wide table land, filled with lakes and peat bogs, which serve as reservoirs to feed the mighty rivers that rise from them, flowing north to Hudson's Bay, or south to the Ottawa and great lakes. Both escarpments of the plateau afford splendid water-power, as well as a fine opportunity to reach its mineral wealth. This latter is improved by the fact that the lithological apex is considerably south of the watershed. The streams flowing south cut through the granite, and give splendid exposures of Huronian or Laurentian rocks along the whole escarpment. The corresponding edge on the north gives a similar one of Cambrian and Devonian—thus giving the prospector a grand opportunity, with comparatively little labor (save that of reaching it and returning).

The soil, when found, bears an abundant growth of white birch, poplar, and cypress (jack pine), suitable for making wood pulp; and its decay fills the lakes with the basis of a more carbonaceous peat than what is generated from sphagnum moss and grasses. Whether its superior heating power will make its manufacture profitable, has yet to be proven—I believe it will. Its position, on the highest part of the C.P.R. in Ontario, with the nickel of Sudbury at one end, and the silver of Port Arthur at the other end of the plateau, ought to make a ready market for it. It may be worked to advantage by water power to supply not only the C.P.R. engines while traversing the plateau, but supply the smelters, or, at least, the roast beds, with a reliable and inexhaustible fuel, after the pine is all swept off, as it soon will be. And why not treat the raw peat as pulp?

After extracting the coloring matters and mineral particles washed into it in the process of collection into the hollows of the rocks, it can be condensed by hydraulic pressure to any extent, and made into small vessels of many kinds. Then, by a judicious mixture of asbestos and plumbago with soapstone, mica, and other incombustible materials, a fireproof, unbreakable and possibly artistic delf might be evolved.

Algoma has farming land for a million settlers, also minerals, pulpwood, peat, building stone and coal to employ millions more. And we are standing at the portal of this treasure house, helpless to improve it for want of population and capital, while these are flowing into the country south of us, and we have to look to enterprising Americans for the development of these resources! Awake! ere too late, O Canada!

HOMO SENEX SILVARUM.

WHAT THE PRESS THINK OF IT.

THE CANADIAN ENGINEER is the name of the latest trade publication. It caters to mechanical engineering in all its branches. The first number is full of valuable technical information and contains a large amount of Canadian news of special interest to engineers, electricians and mechanical specialists.—*Toronto World*.

THE CANADIAN ENGINEER is a new publication issued from the offices at the corner of Court and Church streets in this city, and the Fraser buildings in Montreal. It is a monthly of attractive appearance, and gives evidence of care in the selection of the special articles and news items contained in the initial number. That there is a field in Canada for a well-conducted journal of this sort is shown by the large circulation of the American engineering journals throughout the Dominion. THE CANADIAN ENGINEER devotes much space to notes of engineering and mechanical development.—*Globe*.

THE CANADIAN ENGINEER is the name of a new monthly journal in the interests of the mechanical, marine and sanitary engineers, the manufacturer, the contractor and the merchant in the metal trades, with offices in Toronto and Montreal. Similar journals have succeeded elsewhere, and there is no reason why success should not attend such a venture here. The first number has been issued, and is a very creditable exhibit of the ability which lies behind it. It is very practical, and, besides a number of technical and illustrated articles, contains a large budget of news relating to the mechanical, mining and general manufacturing trades of Canada. We gladly welcome and wish it success.—*The Shareholder*.

The appearance of the paper is quite attractive, slightly copying the size and style of the *Engineering Record*, the reading matter being, however, made up in two wide columns of large type. The illustrations are elaborate, excellently produced, and have the merit of being devoted to practical matters of trade. There are in all twenty-eight pages beside the covers of thick paper. The publishers have gone into the venture expensively, and there is no reason why they should not win the appreciation of their advertisers and subscribers.—*Empire*.

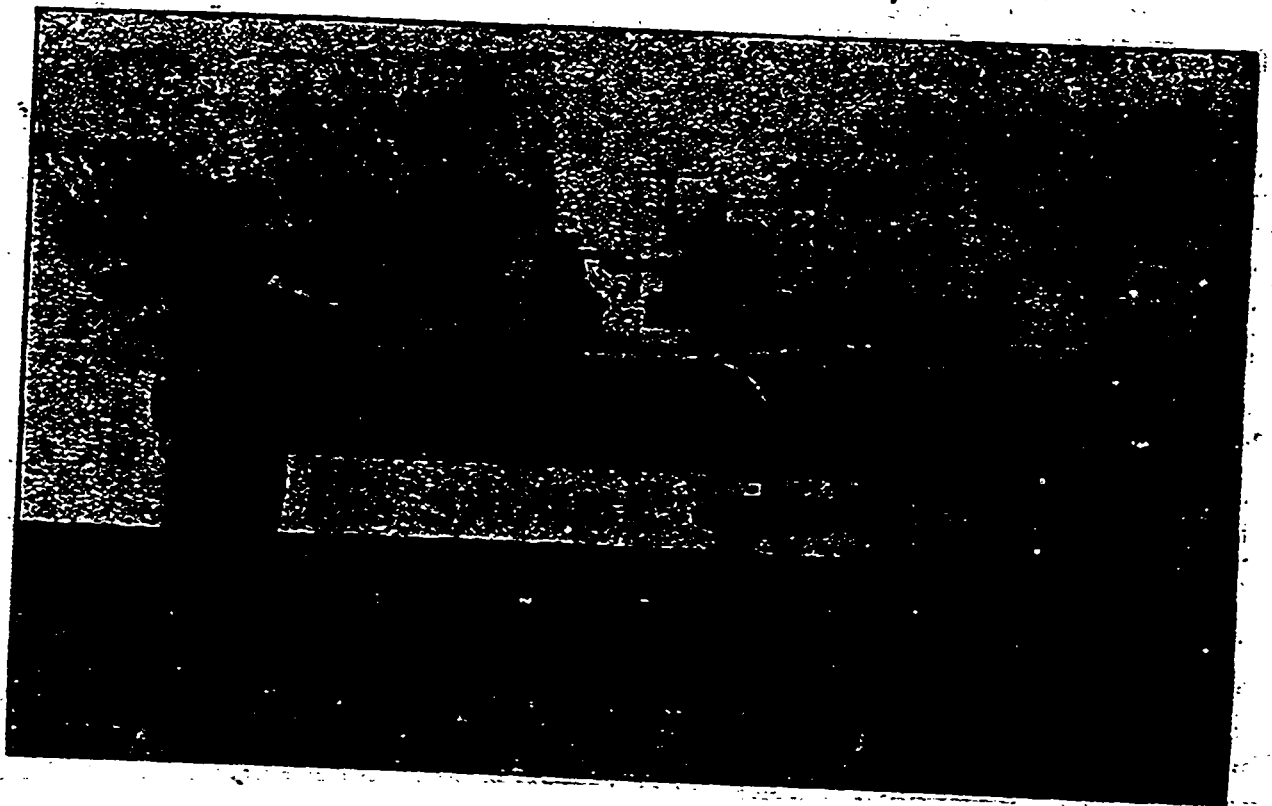
THE CANADIAN ENGINEER, published at Toronto and Montreal, is the latest trade monthly to appear in Canada. Its initial number impresses one favorably.—*Hamilton Times*.

The initial number of THE CANADIAN ENGINEER has been handed to us by that enterprising journalist, E. B. Biggar, of Toronto and Montreal. The venture is floated by the Canadian Engineering Co., and the subscription is \$1 per year, published monthly. The "get-up" is creditable to the publishers and printers, and it is a puzzle how they can afford to give such a handsome periodical, printed on fine, heavy paper, at such a nominal price. The thirty-two pages which comprise the first issue are teeming with information, and will well repay perusal. The advertisers may congratulate themselves, as no doubt each number will be prized and bound in volumes at the end of the year; the advertisements will be found almost as attractive and useful as the literary selections, which are in every way creditable to the publishers. We hope it will meet with that patronage which it deserves, as it should be in the hands of every metal worker, producer, and distributor in Canada.—*Scottish Canadian*.

Of the many periodicals which Toronto boasts, and among the number of new trade journals which from time to time appear, we know of none that has made such a good showing for a first number as THE CANADIAN ENGINEER in its initial issue for the current month. The aim of THE CANADIAN ENGINEER is, according to its salutatory paragraph, "to be a means of advancing Canada in the path of mechanical and industrial progress." And its reason for its existence is to be summed up in the sound contention, that valuable as are the instructive engineering journals published in England and the United States, "they lack the element of Canadian news and of information bearing upon the special needs and circumstances of the country." That the new journal intends to give attention to Canadian affairs is apparent from the topics touched upon. There are leading articles on mica and its industrial uses; bog ores and the Radnor furnaces; comparative tables of the mineral products of Nova Scotia, and the metal imports of Canada; a list of Dominion Government contracts for the next twelve months; technical articles on oil-saving, on pulley-tightening, etc.; a letter upon "The Silver Mining of the Future," having special reference to Kootenay; a page or two each of mining matters, and railway and marine news. And the editor seems to have ranged the whole Dominion over for his long and condensed array of Industrial Notes. Then there are illustrated articles on various industries. A very fair indication of the respectability of the paper is to be found in the character and number of the advertisers.—*Monetary Times*.

Further extracts showing the goodwill of our contemporaries will appear in succeeding issues.

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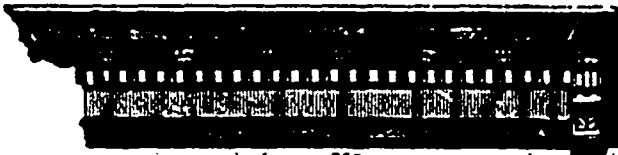
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HARVEY GRAHAM, Secretary



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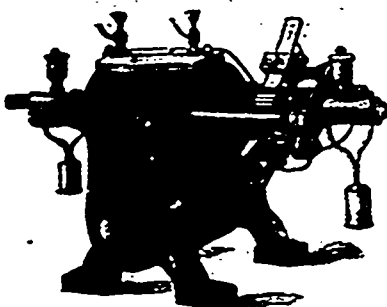
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Industrial Notes.

MALCOLM GRAY, hardware merchant, Orangeville, Ont., has sold out.

THE Breithaupt leather tannery, at Listowel, Ont., has been burned.

THE bridge over the Jack River at Richmond, Ont., is now finished.

THE Nova Scotia Steel and Forge Co. has now a pay-roll of 450 men.

A WIRE nail and screw factory is being erected at Port Hope, Ontario.

THE Grand Trunk will build a new railway bridge at Bridgeport, Ont., this summer.

ARTHUR PEQUEGNAT proposes to form a company to manufacture watch cases at Berlin, Ont.

THE Nanaimo, B.C., Water Company are laying a large number of new service pipes.

THE Kingston Locomotive Works have shipped thirty dump cars to the United States.

THE contractors for the Soulanges canal have put in three new locomotives for their work.

THE Miramichi Foundry, Chatham, N.B., has been purchased by J. M. Ruddock, its late manager.

THE Haggart foundry, Brampton, Ont., after being shut for three years, has just been re-opened.

THE total cost of the new palace hotel of Quebec, the "Chateau Frontenac," now being erected, will be \$500,000.

THE city engineer at Kingston recommends the construction of new water-pipes at a cost of about \$15,000.

THE large new pork packing factory of the Canada Packing Co. at London, Ont., starts operations this month.

THE Merriden Britannia Co., Hamilton, are about to build an addition to their factory, to cost \$3,500.

THE city of Ottawa is to spend \$90,000 this year on drains and sidewalks. Here is a contract for somebody!

J. C. BLAIR, of Sunnybrook, near Lake Rosseau, intends to fit up a saw mill to make lumber, laths and shingles.

CHRISTIE BROS. & Co are to start a trunk factory in connection with their casket and coffin business at Amherst, N.S.

THE Toronto street railway company have received a permit for the erection of a motor shop at a cost of \$30,000.

CAST IRON pipe was imported into Canada last year to the amount of \$100,000. Of this \$50,000 was paid in customs fees.

THE Robb Engineering Co., of Amherst, N.S., are introducing the Fuller & Warren Co.'s system of heating and ventilating.

THE name of St. Henri (Que.) Light and Power Co. has been changed to the Standard Light and Power Co.

THE Donnelly Wrecking & Salvage Co., of Kingston, have the contract for putting in the new flume for the Montreal Cotton Co.

THE I. C. R. Company at Moncton, N.B., are adding to their shop some new machinery made by John Bertram & Sons, Dundas, Ont.

CURRAN BROS.' saw mill at Amherst, N.S., has been burned down. Some of the machinery was quite new. Loss about \$10,000.

THE machinery and plant of the "Compagnie Industrielle de St. Jerome," of St. Jerome, Que., will be sold on the 15th inst. to liquidate the business.

THE Imperial Oil Co. of Petrolia, are about to establish a barrelling and storing station at Hamilton, where both American and Canadian oil will be barrelled.

A MINNEAPOLIS man is putting up a saw, planing and shingle mill near Watson, between Kaslo and New Denver, B.C. The saw mill will have a daily capacity of 40,000 feet.

THE question of rebuilding the bridge at Meaford, washed away recently by the floods, has been left in the hands of the Bridge Committee and the mayor, with the reeve and deputy-reeve of the township. The county council will be asked to share the expense.

J. T. WESTON, stove manufacturer, of Tilsonburg, assigned this month.

THE Toronto Furnace and Crematory Company has been incorporated.

THE Danville, Que., slate quarry is now being operated by the new company.

AT Galt, Ontario, Elliott Bros. are adding a new brick boiler house to their soap works.

A COMPANY is being formed in Paris, Ont., to manufacture a wrench invented by Wm. Houghton.

IT has been decided by the Toronto city council to place \$10,000 on the estimates for a new crematory apparatus.

THE Coleman Brothers have torn down the old salt block and saw-mill at Dublin, and taken the machinery to Seaforth.

CUNNINGHAM & SONS are contemplating the establishment of a steam saw-mill at Port Essington, on the Skeena, B.C.

JOHN LAWRIE & BRO., Montreal, have the contract for the construction of six engines for the Montreal Street Railway Company.

IT is proposed to build a new hospital in Ottawa, to cost about \$5,000. J. P. Featherstone, of that city, is interested in the matter.

MCCOLL BROS. & Co., Toronto, manufacturers of oils, etc., have been incorporated under the style of The McColl Oil Company, Toronto.

ARRANGEMENTS are being made for laying an electric railway between Penetanguishene and Midland, Ont.

W. PELLEW HARVEY is expecting his Crawford mill very shortly and will then make practical tests on gold ores by milling.—*Golden (B.C.) Era.*

THE Boltens, copper smelters of England, are sending out an expert to British Columbia this year to look into the mining properties there.

IT is stated that steel will in the future be admitted duty free when imported by manufacturers for the purpose of making bits, hammers, augers, etc.

G. SPRING RICE, on behalf of the Regina Electric Light Co has offered the company's plant to the corporation of that town for \$14,000. The offer is being considered.

PEAKER & RUNIANS, hardware merchants, Brampton, Ont., have dissolved partnership. Peaker & Son will be the style under which future business will be carried on.

SALT has been struck at the Canadian Pacific Railway well No. 2, near Windsor, at a depth of 1,125 feet. The building and apparatus required will cost \$125,000. One thousand barrels will be the daily output when the works get well under way.

THE Alberta and British Columbia Exploration Company have purchased the rights of the Kootenay Valley Irrigation Company, and have begun work for the purpose of reclaiming the lower lands of the Kootenay River.

THE Toronto paving contract, about which so much excitement has been raised, has gone to the Detroit firm of Guelich & Co., who, it is said, will buy the plant of the Trinidad Asphalt Co., of Toronto.

W. R. GRAY is arranging to exchange some property for the stove foundry, and if the titles are passed, he will take possession of the foundry at once, and commence the manufacture of stoves and agricultural implements.—*Dundas Banner.*

A NEW company has been incorporated at Chippewa, Ont., under the title of the Niagara Peerless Manufacturing Co. Its object is to manufacture threshing machines and agricultural implements in general.

THREE hundred of the mill men of the Chaudiere lumber mills met at Mechanicsville, near Ottawa, on the 18th ult., to agitate for a ten-hour day and to organize under the Knights of Labor.

THE Breithaupt tannery at Listowel was burnt on the 23rd May. It was a large and well equipped one. The loss was estimated at \$14,000 to \$18,000; insurance, \$12,500. The fire was said to have caught from the smokestack.

THE Yarmouth, N.S., Cotton Duck and Yarn Company are erecting a new mill. With its equipment it will cost from \$70,000 to \$80,000, will have a capacity of 10,000 to 12,000 pounds per week, and will give employment to 65 or 70 hands.

THE Royal Electric Company, of Montreal, have eminent engineers preparing plans for the development of the Chambly water power. The work will be begun in July, and is to be finished by November. They expect to develop about 15,000 horse-power.

THE foundry at Tatamagouche, N.S., is closed.

THE St. John, N.B., saw mills are doing a large business.

A STREET railway is to be constructed in Walkerville, Ont.

WAGNER'S saw mills, Port Elgin, Ont., have been burned down.

JAMES STARK'S saw mills at Paisley, Ont., have been destroyed by fire.

AHEARN & SOPER, Ottawa, are building some cars for the Montreal Street Railway.

THE St. Catharines Electric Light Co. have just put in a new and improved dynamo.

DAWSON BROS., of Warkworth, Ont., will build a flour mill in Havelock this summer.

A. R. MCKINLAY & Co. will rebuild their window shade factory in Yonge street, Toronto, at a cost of over \$10,000.

THE Bell Telephone Company is going to issue \$440,000 more stock, making its capital \$2,640,000.

M. G. McLEOD has sold his grist and saw-mill at Welsford, N.B., to McKay, Grant & Anderson.

THOS. ARTHUR'S portable shingle mill at Acton, Ont., has been destroyed by fire.

THE lower bridge across the Big Salmon River, at Dundee, is practically complete.

COWAN & Co., Galt, Ont., have just sent some large machinery to Portneuf, Que., and Brandon, Man.

GOLDIE & McCULLOCH, Galt, Ont., have been making extensive shipments of machinery, electric plant, and safes.

LARGE extensions are to be made this summer to the St. John, N. B., street electric railway system.

THE Dominion Coal Company are having a large number of coal cars built at Amberst, N.S.

THE contract for portions of the new Union station at Toronto has been given to the Central Bridge Works, Peterboro.

KNOWLTON, Que., is to have a new library building to cost \$10,000.

THE Dewey Nail Company of Palmer, Massachusetts, is to establish works in Port Hope.

ALEX. GIBSON, the lumber and cotton manufacturer of Marysville, N.B., is preparing to build twenty double brick houses there.

THE stock of the Waterloo, Que., Knitting Co. is to be increased by \$10,000 and more machinery added.

C. H. PETERS, of St. John, N.B., is to go into the manufacture of upholstery leather.

ABOUT 40 pounds of scrap lead and 240 small brass tubes were stolen from Fisher & Co.'s mills in Dundas the other day.

THE Auburn Woolen Mill Co. at Peterboro' are building an addition to their mill and will enlarge their capacity.

ROBIN & SADLER, the extensive leather belting manufacturers, of Montreal, are to build a new factory this summer.

THE plant of the Hinton Mills Furniture Co., of London, has been purchased by F. G. Rumball at twenty-six cents on the dollar.

JAMES BELL, of Arnprior, will shortly build a factory for the production of cut and ground mica.

JAMES QUINN, while operating a machine at the London, Ont., Furniture Factory, had the tops of three fingers taken off the other day.

THE Hull, Que., city council proposes to issue debentures to the amount of \$40,000 to extend its waterworks system and for sidewalks.

THE plant in the machine works at Stellarton has been sold to parties in Charlottetown, the *Journal* reports, and will be removed shortly. The building is for sale.

FRANK E. BOULTER, of the firm of W. Boulter & Sons, Picton, Ont., has left for the States to purchase extensive canning machinery for the coming season.

HASTINGS, Ont., village council will submit a by-law to grant \$10,000 to the McCormick Harvest Company, of Chicago, if the latter establish a manufactory to employ 200 men.

BALL'S mills at Ormsby, Ont., were burned a few days ago at noon, while the workmen were at dinner. Loss \$5,000, partially insured. No cause assigned for the fire.

CAPT. LORWAY, managing director of the Bras d'Or Steamship Co., has purchased the steamer "Blue Hill," of Yarmouth, to go on the route between Mulgrave, St. Peter's, and East Bay. The price was about \$13,000.

R. A. McLEOD is putting the machinery in his new sash and door factory at Edmonton, N.W.T.

It is said that Waterloo, Que., will utilize the water power at the outlet of Bromelake for lighting that town by electricity.

J. M. PURVIS has had a ten horse-power motor put into his flour mill in Toronto by the Kay Electric Works, Hamilton.

It is reported that the rolling mills and wire nail plant at St. John, N.B., are to be transferred into the hands of a Montreal syndicate.

THE construction of a large new machine for fumigating with sulphur was started at the G. T. R. station, South Quebec, last month.

ALMONTE is to have a file factory. It will be known as the Almonte File Works and the firm will be Shaw & McLeod. It is to start work in July.

HON. MR. WALLACE, comptroller of customs, has ruled that steel for the manufacture of hammers, augers and auger bits is entitled to free entry.

THE stave mill of J. B. Coates, jr., at Blenheim, has been burnt. It employed fifty hands, and had been running night and day. Loss partly covered by insurance.

THE Massey-Harris Company are making a large addition to their factory at Brantford. They will erect a building three storeys high, and 200 by 60 feet.

J. B. SMITH'S SONS, of Toronto, have had a new arc plant put into their saw mill at Callender, Ont. The plant was supplied by the Kay Electric Works, Hamilton.

J. B. SNYDER has bought the machinery and plant of the Graybill Manufacturing Co., late manufacturers of office furniture at Waterloo, and proposes to start the factory again.

MR. SEARGEANT, of the Grand Trunk, is considering the location of divisional workshops at Sarnia. It is expected that Sarnia will give a bonus of \$100,000 and exempt the shops for five years.

THE B. C. Match Factory Co., Ltd., has been incorporated with a capital stock of \$10,000 to make matches at New Westminster. C. J. Fagan, L. B. Fisher, R. C. Lowray and Alex. Ewen are the directors.

SPECIAL Customs Officer Trowbridge made an important seizure last month at St. Catharines of goods belonging to Rooney & Lavendnsky, consisting of a riding gallery, tent, engine and boiler, organ, and the whole of their machinery, valued at \$2,000.

THE committee of the Saugeen council held a meeting at Port Elgin the other day to decide on the erection of Schwass' bridge. It is understood that the tender of Mr. Keys for \$2,000 was accepted.

MR. JOHN J. GORDON will start the manufacture of nails in a portion of the Carleton granite works in a short time. He is now getting his plant in and will go into the business quite extensively. The machinery of the nail factory will be driven by power from the granite works.—*St. John Telegraph*.

WALTER JONES, in company with Mr. Hughes of pulp mill fame, has arrived at Liverpool, N.S., and proceeded to the site of the proposed pulp mill, a short distance above Milton. It is proposed to make all necessary surveys for dam purposes and necessary canal while the engineers are on the ground.

THE Burlington, Ont., Mfg. Company's works, Burlington Station, Ont., have been burned down, throwing 25 hands out of work. Loss \$20,000, with \$7,000 insured. They made wringers, washing machines, etc. The fire is said to have started by spontaneous combustion.

FOR over twenty years the employes of the Georgian Bay Lumber Co. at Waubauskene have been given dwelling houses rent free. Under the new management an order has been issued that after July 1st the employes must pay rent for the dwellings owned by the company. John Waldie introduced a similar order at Victoria Harbor two or three years ago.—*Midland Free Press*.

THERE is an old story about the Yankee who told of a machine in which saw-logs were put in at one end, and beds, chairs and tables came out at the other. A machine very much resembling the one in the story was shown to a *Winnipeg Free Press* reporter the other day by Andrew Strang, at 353 Main street. It was a small ice cream freezer in which the prepared cream was put in at one end, and in less than five seconds, by actual watch measurement, ice cream was ground out of the other end. The right of manufacturing this machine for the whole of Canada has been secured by two Winnipeg gentlemen, and it is probable a factory will be erected there this summer.

A BRIDGE is being built at Tweed, Ont.

J. NICHOLL'S saw mill, Rettle's Station, Ont., has been burned. Work will shortly begin upon a new bridge at Gananoque, Ont.

THE Strachan avenue bridge, Toronto, will soon have to be rebuilt.

PETERBORO is anxious to have a blast furnace, smelter and rolling mill.

THE Steel and Forge Company, New Glasgow, N.S., are making extensions to their works.

THE village of Lennoxville, Que., is to have a waterworks system. James Peyton & Co. have the contract.

A BY-LAW was carried in Fort William recently, granting \$50,000 bonus to a blast furnace.

THE city council of Ottawa are beginning to think it time to buy an incinerator.

WORKMEN are laying the abutments for the new bridge which is to cross the Salmon River at Fisher Hill, Ont.

HOLTON'S saw shingle mill, Belleville, was burnt on the 12th. Loss, \$8,000, insured for \$2,000. Supposed cause of fire—lightning.

THE Massey-Harris Co. of Toronto will enlarge their Brantford factory, and are to commence the construction of a new building.

THE first samples of Axminster carpets made in Canada were turned out last month by the Toronto Carpet Manufacturing Company.

THE Cookshire, Que., by-law authorizing the council to borrow \$30,000 for waterworks and sewerage, has been carried by a majority of over two to one.

THE *Canadian Journal of Fabrics* reports that Alfred Parker has moved his shoddy and woolstock factory from Huttonville, near Brampton, to New Toronto.

THE sixteen-ton boring mill of 104-inch capacity lately erected at the Waterous Engine Works, Brantford, was supplied from the shops of John Bertram & Sons, machine tool makers, of Dundas.

THE arrival at Victoria of a cargo of B. C. iron pyrites for the Victoria Chemical Works marks the beginning of what may develop into a valuable industry for British Columbia.

A LOOSE bolt worked out of the engine in the Doherty factory, Clinton, and dropping in a cogwheel, broke it. The factory had to be shut down until the injury could be repaired.

THE Lincoln county council have named Messrs. Rittenhouse, Tufford, Wilson and Secord a committee to get plans for a bridge over the Ten Mile Creek at Jordan. Money will be borrowed for the purpose.

LOUTH & CLINTON are to build a small bridge over the Twenty-Mile Creek for the county council of Lincoln. Repairs will also be made on the bridges over the Chippawa at Port Davidson and at the Laidlaw Creek.

THE Strickland Canoe Company, of Lakefield, Ont., has received an order for a Canadian canoe to be presented to Princess May of Teck. A Corliss engine is to be put into the factory to drive the new machinery now being added.

THE Ball Electric Light Company have put an incandescent dynamo in the Toronto Board of Trade Building, and have supplied a 15 horse-power motor to Smith Bros., carriage manufacturers, one of the same capacity to Geo. McFarlane, leather merchant, and one 20 horse-power to the Oriental Steam Laundry, Toronto.

THE Bell Electric Co. have supplied four electric elevator motors in Toronto. One direct gear motor was put into the Gutta Percha & Rubber Manufacturing Co., one in the Land Security building, one in the Walker House, and a combined electric and hydraulic motor in the Toronto Chambers.

THE Kay Electric Works, Hamilton, have put in an electric organ motor into the Central Methodist Church, Bloor street, Toronto. The system of operating organs by electricity proves to be much cheaper and better than the water motor, and there will soon be a general change in this department of church equipments.

H. W. PETRIE, machinery dealer, Toronto, has shipped several important orders to British Columbia recently. He is now sending to Richard Stockley, Nelson, B.C., a complete planing mill outfit, including an engine and boiler. He is also supplying a saw mill equipment to the value of \$3,800 to John Sucksmith, who is moving to Kaslo, B.C. Mr. Petrie has also received an order for a massive engine and boiler from W. W. West, of Kaslo, who is fitting up a steamer for service on the river and lake there.

WINNIPEG capitalists have formed a company which they desire to have incorporated as the Northern Elevator Company, capital \$250,000.

LODOVIC DE LA VALLEE POUSSIN, engineer, of Montreal, has ceased to do business alone as E. L. de la Vallee & Cie. and a new firm has been formed under the same name consisting of Ludovic de la Vallee Poussin, managing partner, and Gustave de la Vallee Poussin and F. M. B. Mathys, special partners.

CLEVELAND & NUNNS are busy at work constructing the new mill dam at Richmond, Que. for which \$5,000 was voted. The ratepayers of Melbourne, opposite Richmond, voted on a \$2,500 by-law for the same scheme on the 15th inst. The waterworks by-law, by which a system costing \$62,000 was to be put in at Richmond, was defeated at the polls.

THE contract for roofing the new buildings of the Toronto Exhibition Association has been let to the Metallic Roofing Co., of Toronto. The work will be done by Douglass Bros., Toronto, and the roofing material will have an area of 3,000 squares, or 300,000 square feet. The Eastlake metallic shingle will be used in this work, there being some 40 buildings to cover. The Metallic Roofing Co. are also supplying the new Toronto Drill Shed with their metal laths.

J. Q. BARLOW, chief engineer on the Burrard Inlet and Fraser Valley Railway, was called to give information to the Westminster city council the other day regarding the new bridge. If the bridge is built opposite the city where the water is 70 feet deep, it would cost at least \$450,000, but if built above the mills the cost would be \$125,000. The bridge was planned to carry a load of two engines of seventy tons each, followed by a trainload of 3,000 pounds per lineal foot.

CONTRACTS have been given by the Toronto Board of Works as follows: Asphalt pavement on Winchester street from Parliament to Sumach street, to the Construction and Pavement Co., for \$17,990; asphalt pavement on Mincing lane, to the Trinidad Co., for \$1,137; asphalt pavement on lane in rear of Canada Government Buildings, to the Trinidad Co., for \$997; a concrete walk on Sherbourne street, east side, from Gerrard to Wellesley, to Gardner & Co., at the cost of \$1.19 per yard. The contract for supplying sewer brick east of Yonge street was awarded to Walter Morley at \$6.25 per 1,000, and west of Yonge street to Clark B. Connelly at \$7.25 per 1,000.

AT the yearly convention of the Board of Examiners in connection with the Ontario Association of Stationary Engineers in Toronto last month, the following new members were elected a board for the ensuing year: Fred. Mitchell, London; Peter Scott, Hamilton; Fred. Donaldson, Toronto, and James Devlin (re-elected), Kingston. The following were elected to hold office for the present year: John A. Wills, Toronto, president; Robt. Dickinson, Hamilton, vice-president; Robt. Mackie, Hamilton, treasurer; A. M. Wickens, Toronto, registrar.

JOHN KENNY, an engineer of Oakville, while working at Grimsby, got word on the 2nd inst. that his wife was at the point of death. He took the first train for home, but when alighting from the car, missed his footing and fell under the wheels. Instead of getting home he was taken to the Toronto Hospital, where his leg had to be cut off. While lying in the hospital he learnt that his wife had died and that his two children were down with diphtheria and not expected to live. "Misfortunes come not single spies, but in battalions."

THE Cement and Artificial Stone Company, of Montreal, have bought the rights of manufacture and sale of the new Rockledge pavement. The under-bed of this composition is of cement, sand, and broken flint, in the proportion of one, two, and four parts respectively. Crushed granitic and English Portland cement form the top dressing. After rolling, a firm concrete surface is produced, which is a perfect non-conductor of heat. It also resists the action of even the most extreme frost. It has, when finished, a rather rough surface, and is believed never to wear to a slippery condition.

MONKLANDS, the mother house of the Congregational Nuns, just outside Montreal, was burnt on the 8th inst. The fire caught through the carelessness of plumbers leaving their lighted stove behind them, and the fire appliances were quite inadequate. The loss is over \$800,000, with only \$100,000 insurance. This is the oldest congregation of nuns in Canada, having been founded by Marguerite Bourgeois in 1657. Monklands was formerly the residence of the Governor-General of Canada, and its minarets rising against the sky on the side of Mount Royal made a prominent landmark to visitors. The institution will be rebuilt.

EXCAVATIONS are being made for the new Houses of Parliament at Victoria, B.C.

A CYCLORAMA Company is to be formed in Montreal, with a capital of \$20,000.

THE machinery for the new Macdonald rolling mill at Sunny-side, near Toronto, is being put in.

THE Niagara Falls Electric Power Company are adding two large generators to their works.

GILMOUR & HUGHSON'S new saw mill in Hull is expected to be ready for operations this month.

THE saw and planing mill of Levi Densmore & Sons, Noel, N.S., burnt down the other day, is to be rebuilt.

THE health officer of Nanaimo, B.C., earnestly advocates a new system of drainage for that town.

THE machinery is now all in at Mr. Storey's new mill at the corner of Waverly and Bank streets, Ottawa.

IT is said Newton Cossitt intends erecting a large roller flour mill in Brockville.

THE stone quarry at Sackville, N.B., owned by the New York Quarrying Co., is being opened up under the superintendence of Lamont Melanson.

A NUMBER of machinists have arrived at Amherst, N.S., to work in the new car works. The Amherst Press reports business very lively in the town.

THE hardware firms of McKee & Davidson, and of Fortye & Phelan, Peterboro, Ont., have amalgamated into the Peterboro Hardware Company, with a capital of \$75,000.

H. F. POIRIER and Mrs. O Vanier, of Montreal, have entered into a partnership as the Dominion Safety Lamp and Brass Works Co.

THE Quebec and Levis Electric Light Company has purchased Mr. Peters' large property on Prince Edward street, and will erect a large building and plant thereon.

THE National Electric Tramway and Lighting Co., of Victoria, have purchased the complete electric lighting plant formerly operated by F. H. Osgood, of Seattle.

THE Star Collar and Box Co., Geo. A. Mace, prop., Montreal, has assigned. The principal creditors are paper manufacturers, and the liabilities are \$20,482.

THE Pontiac Telephone Company is applying for incorporation. Its object will be to construct and operate telephone lines between Ottawa and Campbell's Bay, Que., and between other places.

IT is expected that the masonry work of the Sault Ste. Marie Canal will be finished in September. It is expected that the lock gates will be arranged so as to be opened and closed by electricity.

J. & J. TAYLOR, safe manufacturers, of Toronto, have the contract for making the large vaults for the Bank of Toronto's new block in Montreal. This includes a fine steel vault for the bank's own quarters in the building.

THE Fish River Copper and Silver Mining Co., limited, has applied for incorporation. The headquarters of the company are to be in Hamilton, Ont., and the capital \$5,000,000. Mining is to be carried on by the company in British Columbia.

A NUMBER of lumbermen in the United States and Western Ontario are about to start business as the Ontario and Western Lumber Company, with a capital of \$1,000,000. The chief place of business is to be the town of Rat Portage, Ont.

THE Williams, Green & Rome Co., of Berlin, wish to cancel their agreement with Guelph. It cost the city \$3,000 to fit up the old drill shed for their branch shirt factory there about three years ago, and although a penalty was to be paid if they left within ten years, the city will not be the gainer by the bonus.

MANIFESTLY USEFUL.

I have No. 1 of THE CANADIAN ENGINEER, on the appearance of which I congratulate you most heartily. Have glanced through its contents and am much struck with its manifest usefulness and points of interest.

Montreal, 27th May.

E. KING.

Personal.

PROF. MOSES G. FARMER, the electrician, is dead.

JAMES FREDERICK WALKER, traffic auditor of the G. T. R., is dead.

CHARLES B. HUNT is to take charge of the Canadian General Electric Company's Works, at London, Ont.

LOUIS MARTINEAU has been appointed manager of the Albion Iron Works, Victoria.

J. K. FRASER, book-keeper of the Union Association, St. John's, has gone to Rhodes, Curry & Co., of Amherst, N.S.

T. ALLEN, of lacrosse fame, has been appointed chief accountant of the Columbia and Kootenay Navigation Company.

H. J. MCGRATH, of Dorchester, is superintending the repairing of the bridge at Woodstock, N.B., referred to in last number.

STEWART WARDELL now takes the place of John Bertram & Sons, Dundas, vacated by J. C. Greenwood, who goes to Montreal.

J. HENRY, tool designer to the Canadian Electric Works, Peterborough, Ont., is leaving there to accept a position in New York.

E. H. CAMPBELL, Manager of the Winnipeg Street Railway, is visiting the Toronto, Montreal and Ottawa railways getting "pointers."

THOS. NOPPER is to have charge of the Toronto office of E. Leonard & Sons, builders of steam engines and machinery, of London, Ont.

JOHN E. BELCHER, town engineer of Peterboro, has been in Brantford, Toronto and other places inspecting the street railways to ascertain the character of the pavement that had been used on the roads and getting other information.

A. R. GOLDIE and A. J. McPherson, of this town, have passed very successfully the recent examinations at Toronto University School of Science. Mr. Goldie passed his third examination in Mechanical and Electrical Engineering with high honors, standing among the first in every subject. Mr. McPherson passed his third examination in Civil Engineering with honors, and was also at the head in all subjects which he tried.—Galt Reporter.

C. F. MEDBURY, eastern agent of the Canadian General Electric Co., has joined the firm of Ahearn & Soper, the well-known electricians of Ottawa. Mr. Medbury, who was employed on expert electricity work in the United States before coming to Canada, has been very successful since coming to Canada, and is much esteemed by business men with whom he has come in contact. Ahearn & Soper will find in him a good representative. Mr. Medbury will work outside of Ottawa.

THE rights of the knitting machine recently invented by R. W. King, formerly of Georgetown, Ont., and now of Montreal, have been sold in the United States for a large sum. The American firm which is now being organized will manufacture the machines in New York or Philadelphia. It was only recently that the rights for this machine, for England and Germany, were sold to an English company, who have started manufacturing with a capital of £20,000. This is another Canadian who has gained eminence in the mechanical world.

NATURAL gas is said to have been discovered near Winnipeg.

J. HARCOURT, of Ker & Harcourt, bobbin manufacturers, Walkerton, has been visiting Montreal and eastern cities.

THE surfaces of walls may be waterproofed by painting them several times with a solution of soap. This forms a lime solution.

THE death of John A. Morrison took place the other day at Fredericton. He was a well known lumber manufacturer, and was 78 years of age.

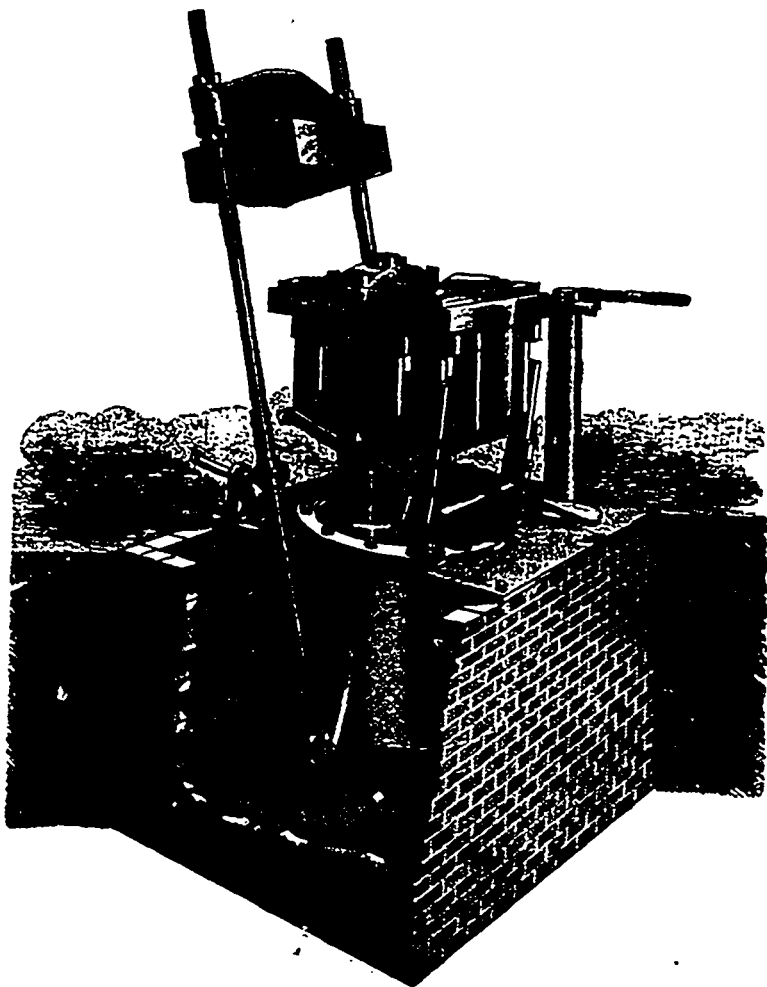
A. LEOPRED, mining engineer, of Quebec, has been invited to lecture at Silver City, New Mexico, on July 4th, before the South-western Mining Engineers' Association.

THE Government is going to raise the water of the St. Lawrence by constructing dams across the northern channel near Dickenson's Landing. This will prevent the necessity of ships going along one of the most troublesome portions of the Cornwall canal.

JAMES G. KIRK, designer and chief engineer of the Esquimaux water works, committed suicide during the last week of May at Victoria, and on the 2nd inst. his brother Andrew shot himself in the same spot. The latter's young wife is hopelessly insane, and a mystery envelops the case.

MACHINE MOLDING.

The development of machine molding, says the *Foundry*, has been gradual. The follow-board which covers, or shuts off, from the sand that portion of the pattern above the joint line, was probably the first change from the original method of molding in boxes. The match-plate, which is a plate fitted with pins and pinholes for the flask, with a portion of the pattern fitted thereon like a medalion, came next. This was a greater improvement, for it compelled



MOLDING MACHINE.

the flasks to be interchangeable. Silhouette, or stripping-plates, followed with decided advantage. The stripping-plate, often called drop-plate, is a plate cut out to receive the outline of the pattern at the joint line; enough is added to the pattern to protect through the plate to the pattern base. Like the match-plate, it is fitted with pins and holes to receive the flask; it is also a molding table, or board, on which the flasks are rammed. Originally, this plate was turned with the flask, and the pattern drawn through the plate by hand. Modifications of the stripping-plate are numerous, nearly all embodying a frame or table with lever attachment for drawing the pattern without turning the flask. A good illustration of this type is the machine for molding pulleys.

The evolution of the power machine from the hand machine was natural, and there are a number of excellent power machines on the market, operated, respectively, by belts and cams, hydraulic, pneumatic, and steam pressure.

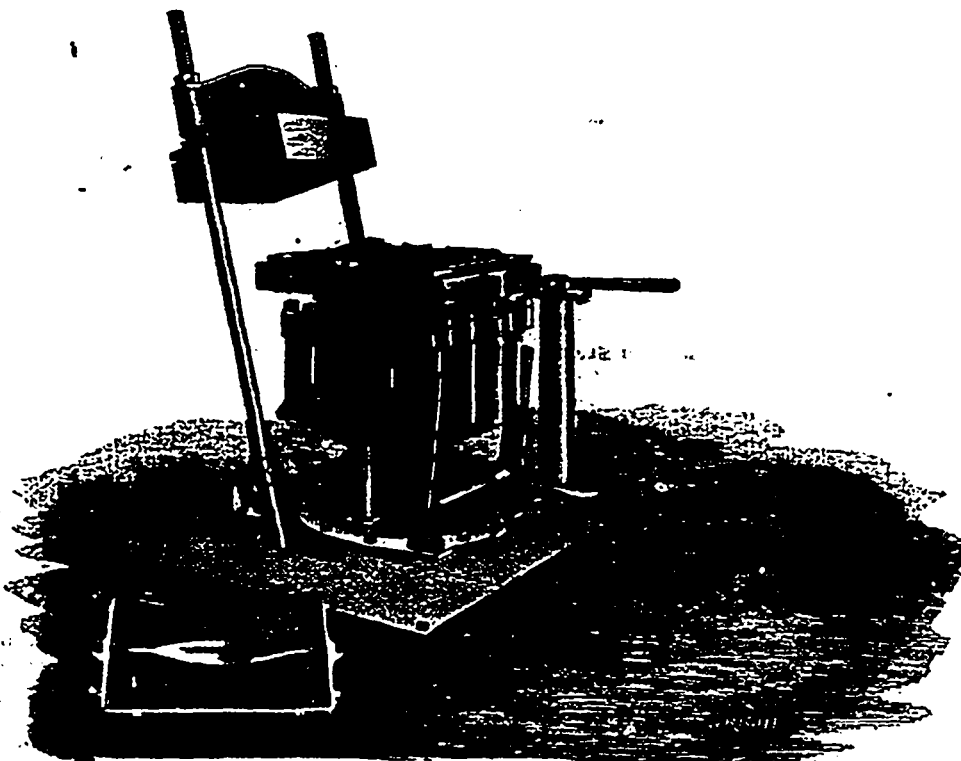
The one illustrated is manufactured and sold by The Tabor Mfg Co., 111 Liberty street, New York, for whom J. & H. Taylor, 751 Craig street, Montreal, are Canadian agents.

It is at once evident to any one witnessing the operation of the machine, that it is making shoes which are superior to those ordinarily made by hand, and as to the rate at which they are made, it is, perhaps, best to state the actual observed time as noted by the writer within which a mold was made and placed on the floor ready for pouring.

The machine is what is called a 16-inch, that being the size flask intended to be used on it. In this case the flask was 14" x 17½"; patterns being arranged for two shoes, which are cast in an inverted position with respect to each other; i. e., of two shoes cast in the same flask, one will be cast face upward, while the second will be the other side upward. The machine is attended by a man with some experience, and he is assisted by a boy, each having certain routine operations to perform, which are repeated exactly for each mold. The "drag," or lower part of the mold, is first made, and when a lot of these are completed and put on the floor, some slight changes are made in the arrangement of the machine, requiring but very few minutes to complete, and copes are then made, the arrangement of the patterns in reverse position, as noted above, making the drag and cope just alike, and doing away with the necessity for any change in the patterns.

Timing the machine, it was found that in making the drag the time required to make a complete cycle of movements, i. e., the time from the placing of one drag on the floor to the placing of another beside it, was 34 seconds; the distance walked with the drag being, in this case, about 20 feet. In the case of the cope, 35 seconds were required, thus making the time for a complete mold 1 minute 18 seconds, which is at the rate of something over 46 complete flasks or 92 shoes per hour. No special effort was manifest during this time, yet no one familiar with manufacturing operations would expect this rate to be maintained for a day; nor even for an hour, under ordinary circumstances; yet after seeing this time made it is evident that 25 molds per hour are easily practicable with the machine.

The operation of the machine is very simple. The half flask is put on the stripping plate, with the sand-box to hold the sand which is to be compressed, and both are filled with sand. The ramming head is then swung forward over the flask against stops



MOLDING MACHINE.

which define its position, and the throttle valve opened. The upward motion of the piston and attached parts carries the flask and sand up to the ramming head, where it is rammed instantly, and upon the throttle valve lever being moved again, steam is cut off, and at the same time exhausted, allowing the flask to descend, the stops then engaging the free ends of side levers, and arresting the downward motion of the stripping plate at a point about midway; the pattern, continuing to descend, is drawn from the mold, and when the piston has returned to its lowest position the sand is struck off the flask, which is then taken from the machine. As the man removes it he presses the tripping treadle with his foot to release the stripping plate frame, which then falls to its proper position with respect to the pattern, and the machine is then ready for another mold.

Water or compressed air may be used instead of steam, if it is desirable.

There are already two of these machines at work in the Grand Trunk Railway shops, Point St. Charles.

THE ELECTRIC RAILWAY FENDER.

Editor CANADIAN ENGINEER,

SIR,—A copy of THE CANADIAN ENGINEER for May has been received. Many thanks for the kind notice of the "Fender."

Some of the street railway officials here have expressed the opinion, that "It is impossible to put any attachment on an electric car that will save life." The manager has, however, given me a car to experiment with, and I believe will give the "Fender" a fair trial, which is all I desire. Had this machine been on the car last Tuesday morning, the sad accident which then occurred would have been avoided; the two little children, when the car was stopped, would have crawled off the "fender," cried a little from fright, but gone on to school.

I am having a working model made now as fast as possible; when finished and placed on the car, it will be subjected to any practical tests suggested, and I feel confident that it will pass through the ordeal with flying colors.

Enclosed please find \$1, subscription for THE CANADIAN ENGINEER. If not presuming, would compliment you on the finish of the cuts in it, and the clear, presentable appearance of the type-matter. That it may out-rival New York's world-renowned publications is the wish of

Yours, very truly,

ED. ROCHESTER.

54 Rochester Street,
Ottawa, June 3rd, 1893.

TO CORRESPONDENTS.

To G. D., Petrolia.—A good deal depends upon the present state of your son's education. Suppose him to be qualified say for a second-class Ontario teacher's certificate, we would say that it would be well to put him at once into a machine shop, where he can learn every department of the business. Even if he is not so well qualified, it will not be a bad plan to set him at work; and if you have means so to manage, let him have a part of his time to pursue studies along with work. You do not say whether he wishes to devote himself to mechanical or electrical engineering. The latter affords the best field and many men devoted to stationary and other branches of engineering are now studying electricity at nights, or at odd hours in shops. Should you desire your son to attain a high standard of theoretical knowledge before putting him into practical work, send him to the technical department of McGill College, Montreal, or the School of Technical Science, Toronto, the former being admirably fitted up. Both these schools have machine shops, but the work is more for scientific demonstration than for what we may call machineshop work. A letter addressed to either of these institutions will procure you a calendar containing full information.

In nature, marble is made out of chalk by water, which percolates through the chalky deposits, dissolves the chalk particle by particle, and crystallizes it, mountain pressure solidifying it. It has been found that similar results may be accomplished by chemical means. First, slices of chalk are dipped into a color bath, staining them with tints that will imitate any kind of marble known. For this purpose the same material stains are used as are employed in nature. For example, to produce counterfeit "verde antique," oxide of copper is utilized. In like manner green, pink, black and other colorings are obtained. Next, the chalk slices go into another bath, by which they are hardened and crystallized, coming out, to all intents and purposes, real marble.

The Patent Review.

THE following patents were granted last month in the United States to Canadian inventors: Thomas Brooks, Peterborough, Ont., Hot Water Furnace; Arthur Jennings, Montreal, Que., Wagon; Robert H. Laird, Toronto, Ont., assignor to W. H. Laird, N. Y., Apparatus for Vaporizing Oil; Frederick W. Mount, St. John, N.B., Steam Engine Regulator; William J. Still, Toronto, Ont., Electrical Rotary Motor.

RECENT PATENTS.

The following are some of the recent patents registered at Ottawa, of interest to the trades represented by this journal:—

- 42,567 Valve gear, C. F. Littlejohn, April 12th.
- 42,579 Boiler, H. A. R. Dietrich, April 12th.
- 42,571 Stove and furnace, S. P. Hutchinsen, April 12th.
- 42,589 Steam and hot water boiler, A. Catchpole, April 13th.
- 42,592 Car journal box, E. W. M. Hughes and E. M. Dickerson, April 13th.
- 42,595 Water tube steam-boiler, H. W. Seller, April 13th.
- 42,596 Locomotive boiler, J. S. Newlin and W. S. Coburn, April 13th.
- 42,601 Draft regulator, C. D. Howard, April 13th.
- 42,607 Heating apparatus, A. J. Walker and C. M. Lukens, April 14th.
- 42,618 Journal box lifter, E. E. Taylor, April 14th.
- 42,620 Valve for steam engine, F. W. Bruce, April 14th.
- 42,623 Railway brake, T. A. Allen, April 14th.
- 42,624 Street car heater, G. Myers, April 14th.
- 42,625 Steam engine, C. F. Littlejohn, April 14th.
- 42,631 Extracting and sawing stone and minerals, P. Denard, April 14th.
- 42,634 Street car, J. Marshall, April 15th.
- 42,635 Railway signalling, J. J. Boyle, April 15th.
- 42,640 Centrifugally treating particles of metallic or mineral bearing substances of different degrees of specific gravity, O. B. Peck, April 15th.
- 42,650 Friction roller, The Brussels Tapestry Co., April 17th.
- 42,652 Nut lock, J. C. Cooke, April 17th.
- 42,653 Valve gear for engines, The Wolf Valve Gear Co., April 17th.
- 42,654 Drawing sheet metal, E. & O. W. Morton, April 17th.
- 42,672 Thill support, W. M. Buchanan, April 18th.
- 42,678 Interchangeable lining for journal bearings, F. E. & C. W. Leonard, April 19th.
- 42,689 Thermostatic instrument, M. Martin, April 19th.
- 42,699 Pneumatic balanced slide valves, J. McDonald, April 21st.
- 42,701 Nut lock, E. W. Taylor, April 21st.
- 42,704 Compressing and pumping apparatus, A. Reidler, April 21st.
- 42,706 Rotary pump, B. F. Taber, April 21st.
- 42,707 Automatic gauging tape, G. F. Oakley, April 21st.
- 42,718 Centrifugal machine, R. Folsche, April 22nd.
- 42,740 Auger bit, A. L. Adams, April 22nd.
- 42,744 Wire coiling and cutting machines, J. Fulgham, April 22nd.
- 42,747 Attachment for moulding machines, R. M. Sheleby, April 22nd.
- 42,752 Compound for treating fuel, R. C. Flower, April 22nd.
- 42,753 Automatic brakes for railway cars, Curtis Whitacre, April 22nd.
- 42,754 Engine valve, W. Curtis Whitacre, April 22nd.
- 42,755 Couplings for pipes, John Suydam, April 22nd.
- 42,763 Piston valves for steam engines, M. E. Hersley, April 22nd.
- 42,767 Controlling draft in chimneys, George Lander and F. Niell, April 22nd.
- 42,710 Electric lamp elevating windlass, C. R. Eddy and S. E. Whitehead, April 21st.
- 42,727 Electrically heated smoothing iron, Butterfield-Mitchell Electric Heating Co., April 22nd.
- 42,731 Electric regulator, Electric Secret Service Co., April 22nd.
- 42,709 Process of treating sludge, The Grasselle Chemical Co., April 21st.
- 42,780 Coverings for steam boilers, F. Sparham *et al.*, April 22nd.
- 42,783 Furnace, E. Gurney, April 22nd.
- 42,784 Steam motors, E. H. Edwards and Edgar Ambrose, April 22nd.
- 42,564 Cooling the iron in transformers or in the armatures of dynamo electric machines, H. A. Rowland, April 12th.

- 42,597 Underground conduit for electric railways, C. P. Tatrow, April 13th.
- 42,630 Storage battery, P. Kennedy and C. J. Diss, April 14th.
- 42,632 Electric lamp lighter, J. C. Chambers, April 15th.
- 42,642 Electric welding apparatus, H. Lemp, April 15th.
- 42,667 Electric arc lamp, Reliance Electric Manufacturing Co. (Limited), April 18th.
- 42,786 Machine for moulding cement pipes, Emanuel Oehrle, May 1st.
- 42,788 Car coupler, W. F. Richards, May 1st.
- 42,790 Wheel box and axle, Levi Harris, May 1st.
- 42,795 Signal transmitting apparatus, H. A. Chase, May 2nd.
- 42,803 Car coupler, C. C. Haub and J. F. Dasha, May 2nd.
- 42,804 Radiating furnace, W. J. Copp, May 2nd.
- 42,819 Stave cutting machine, C. W. Rich, May 4th.
- 42,821 Stave jointing machine, C. W. Rich, May 4th.
- 42,838 Fire escape, Sydney Simmons, May 6th.
- 42,848 Coupling for pipes, J. B. Cook, May 9th.
- 42,849 Tenoning machine, W. A. Bennett, May 9th.
- 42,855 Machine for crushing ores, cinders, etc., W. W. Sly, May 9th.
- 42,856 Railway signal, G. F. Adams and J. S. Lyman, May 9th.
- 42,857 Log-hauling locomotive, H. J. Sullivan, May 9th.
- 42,860 Car coupler, W. T. Richards, May 9th.
- 42,865 Drill chuck, C. E. Billings, May 10th.
- 42,868 Automatic railroad switch, W. A. Dacker, May 10th.
- 42,869 Reducing ores, A. J. Rossi and J. McNaughton, May 10th.
- 42,871 Pump, C. S. Reinhardt, May 10th.
- 42,876 Car coupling, I. A. Gould, May 12th.
- 42,880 Making coil or spiral springs, F. M. Jeffrey, *et al.*, May 12th.
- 42,882 Car coupling, American Safety Car Coupling Co., May 12th.
- 42,884 Engine valve, H. R. Fay, *et al.*, May 12th.
- 42,885 Car coupling, H. Schaeffer, *et al.*, May 12th.
- 42,886 Lock nut, T. Gore, *et al.*, May 12th.
- 42,887 Frame for traction engine, Sawyer & Massey, Ltd., May 12th.
- 42,889 Combination wrench, H. A. Post and T. W. Wright, May 12th.
- 42,909 Injector, A. G. Brooke, May 15th.
- 42,912 Nippers for oil cup feeder lifters, S. R. Lewis, May 16th.
- 42,913 Ball bearing, G. F. Simonds, May 16th.
- 42,914 Double flush tank for water-closet, J. C. Beekman, May 16th.
- 42,920 Water-closet bowl, H. A. Jakes, May 16th.
- 42,925 Piston lubricator, E. Glover and R. L. Matthew, May 17th.
- 42,926 Extracting apparatus, Merz Universal Extractor and Construction Co., May 17th.
- 42,931 Steam engine, A. Kundsén, May 17th.
- 42,934 Excelsior cutting machine, C. G. Smith, May 17th.
- 42,935 Safety buffer for street car, J. Hughes, May 17th.
- 42,941 Feed mechanism for screw cutting lathes, W. P. Norton, May 18th.
- 42,942 Steam engine governor, W. O. Webber, May 18th.
- 42,946 Guide for stamp mills, E. Major, May 18th.
- 42,948 Pipe union, J. T. Bibb, May 18th.
- 42,949 Sash lock, J. H. Thomas, May 18th.
- 42,950 Water escape valve or drain cock, F. A. Russell, May 18th.
- 42,951 Pneumatic wheel for cycles, etc., J. C. Hall, —.
- 42,787 Electric switch and case for containing and protecting the same, Augustus Wright, May 1st.
- 42,805 Fire telegraphy, S. J. Sandford, May 3rd.
- 42,815 Electrolytic treatment of cupreous liquors, ores, etc., Carl Hoepfner, May 4th.
- 42,883 Electric welding, T. C. Lemp and L. M. Schmidt, May 12th.
- 42,893 Electrical propulsion of vehicles, E. H. Johnson, May 13th.
- 42,901 Power transmitting device for electric railways, E. H. Johnson, May 15th.
- 43,115 Impts. in cans, William Pratt, Montreal, Que.
- 43,116 Impts. in chemical fire engines, Charles Patton, Collingwood, Ont.
- 43,117 Impts. in fruit car heating apparatus, Consolidated Car Heating Co., Albany, N.Y., U.S.
- 43,118 Impts. on system of lighting cars by electricity, Consolidated Car Heating Co. Albany, N.Y., U.S.
- 43,119 Non-heat conducting coverings, William Harvey Novies and T. P. Hornsby, Washington, U.S.
- 43,120 Valves, The Pneumatic Tyre and Bicycle Company, Ltd., Coventry, England.
- 43,121 Incandescent electric lamp, Henry Lachs Raliske, Eugene, United States.
- 43,122 Vending apparatus, Hess Postal Facility & Supply Company, Pennsylvania, U.S.
- 43,123 A combined axle, nut, wrench and wheel lifter, J. Robertson, A. B. Rudd, and H. H. Neilson, Perth, Ont.
- 43,124 Brick kilns, Henry & Kinzel, Knoxville, Tenn., U.S.
- 43,125 Neckyoke and pole connection, James S. Brown and H. A. Marks, Eureka, Cal., U.S.
- 43,126 Apparatus for heating street cars, Consolidated Car Heating Co., Albany, N.Y., U.S.
- 43,127 Upright steam boilers, The Kootenay & Colum. Prospecting and Mining Co., Ottawa, Ont.
- 43,128 Faucets, Samuel J. Merrill, Los Angeles, Cal., U.S.
- 43,129 Automatic electric fire, Leonidas G. Woolley, Grand Rapids, Mich., U.S.
- 43,130 Small arms, The International (Gifford) Gun & Ordnance Company, London, Eng.
- 43,131 Appliances to be used in connection with sewers, Robert McKenzie, Sydney, New South Wales, Australia.
- 43,132 Two-wheeled delivery vehicles, Manly Breaker Boone, Galveston, Texas, U.S.
- 43,133 Relating to wheels for velocipedes, The Pneumatic Tyre and Bicycle Co., Coventry, England.
- 43,134 Machines for making glass bottles, T. U. Sinnott, Wenonah, N.J., U.S.
- 43,135 A disk harrow and pole attachment, Elijah A. Ovenshire, Detroit, Mich., U.S.
- 43,136 A process of obtaining metals and metalloids, Hermann Nienerth, 41 Lutherstrasse, Berlin, Germany.
- 43,137 Axle lubricators, Charles Wilder Brewer, Cambridge, Mass., U.S.
- 43,138 Cash recorders, Charles H. Coles, Owosso, Mich., U.S.
- 43,139 In and relating to apparatus for pulverizing or disintegrating grain and other dry substances, The Central Cyclone, Sydney, London, Eng.
- 43,140 Car trucks and equalizing devices, John A. Brill, Philadelphia, Pa., U.S.
- 43,141 Actuating devices for car brakes, John A. Brill, Philadelphia Pa., U.S.
- 43,142 Apparatus for vaporizing oils, Robert H. Laird, Toronto, Ont.
- 43,143 Wood-working machines, James H. Reed, Lynn, Mass, U.S.
- 43,144 Chairs, Fred. A. Dennett, Sheboygan, Wis., U.S.
- 43,145 " " " "
- 43,146 " " " "
- 43,147 Smoke funnels, Henry H. Goodridge, Chicago, Ill., U.S.
- 43,148 Pneumatic tyres, John Fullerton Palmer, Riverside, Ill., U.S.
- 43,149 Dynamometers, Edgar James Wood, New York, U.S.
- 43,150 Coal conveyers, Theodore Harding Lewis, Boston, Mass., U.S.
- 43,151 Gas burner, John W. Haywood, Toronto, Ont.

LITERARY NOTICES.

H. W. PETRIE, machinist and machine dealer, Front street west, Toronto, has issued his 17th catalogue, which contains 96 large and closely printed pages. This is more than a mere catalogue, for it contains a description, more or less detailed, of most of the machines in stock at Mr. Petrie's depot. It is the largest catalogue yet issued in Canada, and is sent free to those wishing to do business with Mr. Petrie.

THE *Dominion Grocer* has been purchased from Lightbound, Ralston & Co. by J. L. Wiseman, who has changed the style of the paper to the *Dominion Grocer and Fruit Exchange*. Mr. Wiseman has been more or less associated with trade journalism for many years past, is an active and able business man, and possesses all the qualifications necessary to make such a paper a financial success. The first number he has issued already shows marks of his energy and tact, and now that the paper is published on its merits, and not as the organ of a firm in the trade, it will prosper. We wish it the greatest success.

ALEXANDER SIEMENS says that the best method of using electricity for manufacturing purposes is to fix an electric motor to each machine tool, and it has been proved that electric transmission supplies to a machine at least 70% of the horse power indicated, while with shafting not more than 63% is made available.

FOR foundations on a swampy soil, iron turnings in casks have been found superior to cement. Casks are set in holes in the ground, and are filled to the depth of about a foot, with iron turnings. In these casks posts are set and they are then filled up with more turnings, hammered down tightly. A solution of salt and water is poured over these until they solidify into a hard, compact mass. Oxidation then ensues to such an extent that the posts become charred, and are thus preserved from decay.

Mining Matters.

AT Bothwell, Ont., oil has been struck at a depth of 365 feet.

OPERATIONS have been begun in the Broad Cove Coal Mines, Cape Breton.

EXCITEMENT continues about Alberni, as a result of gold finds at Sprout Lake, B.C.

A TWENTY-TON shipment of Mountain Chief, N.S., ore yielded \$120 to the ton.

A FRESH seam of good coal has been discovered in the Scott pit at Westville, N.S.

AN English syndicate is contemplating the erection of mica works at Kingston, Ont.

FINE gypsum deposits will be opened up when the Tobique Valley Railroad is in working order.

THE Memramcook (N.B.) Gold Mining Co. now have their gold crusher at work.

A PIECE of gold ore has been found near Duncan River, B.C., which gave \$206 to the ton.

AN American firm have purchased the Clute & Jenkins iron mine near Coehill, Hastings, Ont.

AMONGST the deepest mines in the world is the silver one at Prziham, Bohemia, which is more than 3,300 feet deep.

THE Strathyre Mining Company (Ltd.), of Vernon, B.C., has been incorporated.

THE Fish River Copper and Silver Mining Company (Ltd.), Hamilton, are applying for incorporation.

THE Mooretown, Ont., Salt Company have begun operations. Their pan has a capacity of over 200 barrels per day.

THE Snowdon Iron Mines, Ont., contain ore running 60 per cent. metallic iron, with very little sulphur or phosphorus.

AN offer of \$50,000 has been made by an English Company for the Eureka, Richmond and Mineral Hill Mines, Kaslo, B.C.

THE Wellington Mine, Kaslo, B.C., shows silver ore averaging over 300 ounces to the ton.

IT is probable that there will be plenty of gold seekers and miners at work on the Salmon River this year.

THE Wah Lee Company have established hydraulic works at Hopeville, near Quesnelle, B.C.

THE Peterborough Board of Trade, Ont., want the Canada Iron Furnace Company to erect plant there.

THE Sydney coal mines, Cape Breton, are shipping more than a thousand tons per day.

THE Grand Lake mining property in Queen's Co., N.B., will probably be bought or leased shortly by American capitalists.

CHAS. LEDUC, of Hull, is leaving for England, to sell his mining properties in the Templeton and Gatineau districts.

ALEX. McINNIS, manager of the Springhill, N.S. coal mines, has recovered from his recent illness.

AT the Maitland Gold Mines, Tudor township, an improved Crawford gold crusher is to be erected. It will cost about \$5,000.

IN seven pieces of quartz (total weight barely 368 ozs.) taken from the Carribou Mines, N.S., experts say there are contained 40 ozs. 10 dwts. of gold.

W. MOLIN, M.E., says that the Belmont, Ont. Iron Mine contains within 100 feet of the surface over 1,000,000 tons of high grade Bessemer ore.

AT the Freddie Lee, B.C., Mine there are large quantities of ore on the dump, and are only awaiting the completion of the wagon road or railway to ship it *via* Kaslo.

THE Memramcook, N.B., Gold Mine has been surveyed and a good opinion formed of its capacity. Active preparations are being made for its operation.

MR. HOBSON, manager of the Discovery claim, on Horseflike Creek, B.C., is calling for tenders for a ditch of seven miles with lead pipes.

MR. JONES, an English mining expert, has formed a company, called the Newfoundland Mineral Syndicate, with headquarters at Southampton, Eng., to operate asbestos mines at Port-au-Port, St. George's Bay, Nfld., where an outfit of machinery has been laid down.

A VEIN of cube galena has been discovered in the Goat River, B.C., district, assaying 125 oz. of silver and 75 per cent. lead to the ton.

THE new steel bridge over the Pend d'Oreille, will probably be finished this month, when railroad connection with the mines will at once be made.

A COMPANY is being formed, with a capital of \$200,000, to prosecute mica mining in Ontario. The headquarters of the new company will be at Detroit.

THE Patterson Mfg. Co (Ltd.), Toronto, has been incorporated. It will manufacture building papers and roofing materials, and deal also in coal tar products.

C. L. MITCHELL is erecting at Lily Lake, near Oxford Station, N. S., a drying-house for absorbing the water from fossil fluor-spar, a large deposit of which has been found there.

MR. SAMPSON, the inventor of a patent process for catching float gold, has gone to the Nation river, B.C., taking with him machinery and a force of fifteen Canadians and twenty Indians.

THE Victoria Hydraulic Company, Quesnelle, B.C., have laid 500 feet of piping eighteen inches wide. Three large monitors have been set, and work will be commenced immediately.

AMONG the most costly of the metals are gallium, worth \$22,220 per pound troy; thorium, \$6,341; glucinum, \$4,476; lanthanum and lithium, \$3,730 each, indium, tantalum, and yttrium, \$3,357 each; and didymium, \$3,356.

THE incline shaft of the Lethbridge colliery, Alberta, was closed last month. The closing of the shaft affects seventy-five persons. Efforts will be made to engage most of the men at other work connected with the railway and colliery.

YET another coal property in Nova Scotia! It is located at Broad Cove, and is owned by Mr. Hossey and other American capitalists, who will shortly begin constructing a railway to the nearest spot convenient for shipment.

A LARGE party of gold-seekers are *en route* for a spot just above the mouth of the Nation River, Que. They have with them a new machine for catching gold, invented by Sampson, with which they hope to meet with success.

THE Victoria Hydraulic Company have shifted their entire plant from the south fork of the Quesnelle River to Keithley Point on the north fork of that river, in the Cariboo district, B.C. They have sixteen men at work, and have just put up a new saw mill.

THE Kanaka Bar Gold Dredging Company, Vancouver, are to commence operations soon at Kanaka Bar, near the C. P. R. cantilever bridge. They will search for the gold at the bottom of the Fraser river, by means of a patent centrifugal pump.

THE following are the officers elected for the Boston and Nova Scotia Coal and Railway Company:—J. W. Candler, Boston, president; J. McKean, Maban, N.S., vice-president; W. J. Fraser, Halifax, treasurer; and A. C. Rose, North Sydney, N.S., secretary.

J. & C. RUSSELL have commenced to operate their mine on Calumet Island. Colin Campbell is superintendent. It is expected that railway connection will soon be had from this and a neighboring mine with the outside world.

A LARGE strike of high grade galena is reported from Eight Mile creek, near its junction with the Duncan river, not far from Kaslo. Prospectors are pouring into the new field as fast as they can get there. The town of Sayward is growing at a rapid rate, and five hundred men are camped in and round about the place on railroad work.

FORAN'S "Silver Cliff" mine at Placentia Bay, Newfoundland, is to be worked vigorously this season, the owner having concluded a favorable arrangement with some American mining capitalists. From the Tilt Cove copper mine favorable intelligence has been received. The output during the month of April is reported to have been 7,000 tons of ore.

THE Bird's Creek correspondent of the *Madoc Review* writes:—George Tennison has sold his mica mine to James Best for a good sum, and we are given to understand it will be worked at once. The mica cutting house conducted by Mr. Coxwell is running full time, N. Switzer, of Verona, being foreman cutter. They are cutting some beautiful mica which comes from the Queen City mine, owned by W. R. Membry, of Toronto.

A LARDEAU correspondent of the *Victoria Colonist* salutes the first lady arrivals in that village in the following style:—All hail to the fair sex! The first to arrive at the Gateway City were Mrs. McCrae and Mrs. Richardson with four children. They were warmly welcomed, and the way the boys raised their hats, a person would have thought it a common occurrence, when, in fact, we had not seen one of the gentle sex for almost two months.

Brief, but Interesting.

FOR opening and closing the lock gates on the Soo Canal, electricity will be used.

MANGANIN is composed of 83 per cent. of copper, 4 per cent. nickel and 13 per cent. manganese.

It is claimed that by the Herault-Killian process of preparing, it is possible to sell aluminum at 15 cents per pound.

PAVEMENTS in London are now being made of granulated cork and bitumen, pressed in blocks. It is very elastic.

IN England, France and Germany, over 150 periodicals devoted to electricity are published each month.

BRICKS made of plaster of paris and cork are now used in the construction of powder mills. In case of explosion less damage is caused.

To prevent aluminum from being corroded by salt, hot or cold water, and to increase its power of tension, the addition of a little tungsten is recommended.

AN improved method of making steel consists in adding to the molten iron briquettes formed by compressing a mixture of pulverized anthracite and lime water. It is claimed that by this method any required temper and quality of steel can be produced with accuracy.

THE hottest part of the positive carbon of an electric light is said to be 3,500 C., the temperature at which carbon volatilizes.

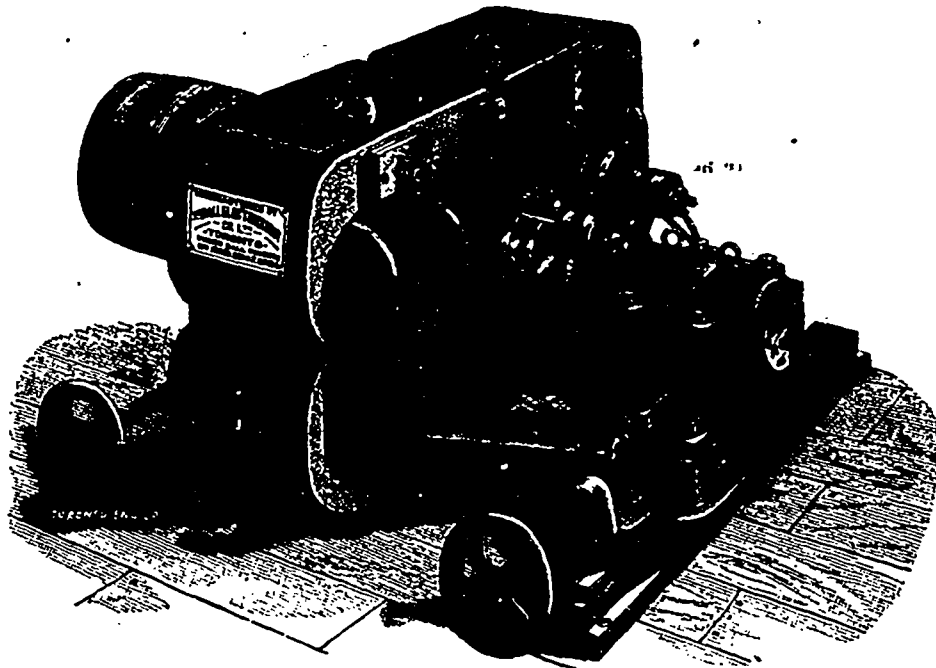
A HINDOO has just made a trial trip across the river Hooghly on a water bicycle which he has made. It is in the shape of a bicycle fixed on the sides of two strong horizontal buoys.

ALUMINUM is now being used in the manufacture of slate pencils. It is said that they write as clearly as ordinary pencils, with less pressure, that they never require sharpening and that the writing is easily erased.

COPPER has been found in a pigment obtained from the feathers of the turacou, an African bird. Each bird, it is calculated, possesses less than one-fifth of a grain of copper; so the discovery is hardly likely to result in anything more than a merely scientific interest.

DINGLER'S *Polytechnic Journal* describes a new glass which is nearly impervious to the calorific rays, a plate one-third inches thick only allowing about 11 to 12 per cent. of the total heat from a bat's-wing burner to pass. The glass is made from 70 parts of sand, 25 of china clay, and 34 of soda.

A PECULIAR form of steam tug has been invented, which can be used either on land or water. In the latter it is worked by side-wheels either backward or forward; while on land it is propelled by means of a cable drum on which is coiled a steel wire cable fastened by pulleys to some fixed object in front, the boat moving as the wire is coiled up. It draws about 28 inches of water, is 37 feet long, and on land will move over an elevation of one foot in three.



ELEVATOR MOTOR.

ACCORDING to a new instrument called the sclerometer for determining the hardness of minerals, pure copper is rather harder than pure zinc.

THE Empire State express, on the New York Central Railway, has beaten all previous records by attaining a speed of a mile in thirty-five seconds, or, a rate of 112 miles an hour.

RAOUL PICKET has succeeded in obtaining the lowest temperature known, 491°F. below the freezing point. He has also been able to reduce the atmosphere to a liquid state.

NICKEL steel is beginning to be used in the manufacture of guns. It is believed that for weapons subjected to high pressures the incorrodibility and great elasticity of this alloy render it peculiarly adapted.

A NOVEL electroscope has just been made by E. C. Rimington, an English electrician. A small T-shaped tube terminating in two bulbs is rotated between the finger and thumb or by a small motor. On bringing a rubbed ebonite or glass rod near, a set of double fan-shaped images of light appears in the tube.

A STREAM of water from a nozzle with a diameter any place between 6 and 9 inches, with the surface of the source of supply 150 feet high, will furnish power enough to lift a boulder of 1,000 pounds into the air and hold it there. A stream of this character cannot be cut with an axe, as it is made as impervious as a ball of tempered steel by the enormous pressure resting upon it.

IN making the old smelting furnaces clay was used, and it is supposed that the famous Damascus blades owed their excellence to the fact that this clay gave out a small quantity of its aluminum, which then entered into the composition of the steel.

G. JEREMIAH, Columbus, Ohio, has invented a new apparatus for the execution of condemned persons, which he claims to be painless. The victim's head is locked into a leather-lined helmet fastened to the back of a chair, to the seat of which the rest of his body is clamped in a similar way. Upon the movement of a trigger, a spring is released which throws the seat one way and the helmet another, so that the victim's neck is instantly dislocated.

ELEVATOR MOTORS.

THE accompanying cut represents a new electric motor manufactured by the Ball Electric Light Co., Toronto, for electric elevators and other work. This company supplied the electric apparatus in connection with the new Fensom electric elevators referred to in last issue. The motors made by this company are largely in use in the various cities of the Dominion, and the Ball Company claim that in all the work supplied by them they have not found it necessary to repair a single motor or incandescent dynamo of their own make. These motors are built in several designs, depending on the nature of the work required of them, and the company guarantee them to stand a heavier overload than any other motor in use.

Railway and Marine News.

OPERATIONS have begun on the new Calgary and Knee Hill Railroad.

THE C.P.R. are building at Winnipeg an elevator which will cost \$500,000.

THE street railway company's stables at Winnipeg have been destroyed by fire.

THE C.P.R. has acquired the Bellingham Bay and British Columbia Railway.

THE Pend d'Oreille bridge, on the Nelson and Port Sheppard line, is now complete.

SIXTY miles of the Baie Chaleur Railway are now practically in working order.

A LIGHTHOUSE and fog alarm are to be constructed at Cape Salmon, near Murray Bay.

THE I.C.R. engine men at Halifax, N.S., have just received a substantial rise in pay.

THE contract for the first eight miles of the O. A. & P. S. R. has been given to W. Heald.

THE extension of the Lake Erie & Detroit River Railroad to Ridgetown, Ont., has just begun working.

THE C. P. R. have been inspecting the Tobique Valley, N.B., railway, with a view to operating it themselves.

THE Toronto Street Railway Company are going to extend their electric line as far as the eastern city limits.

IT is expected that the O & P S railway will be open from Ottawa to Arnprior by the middle of July.

THE borings in connection with the survey for the proposed P. E. I. tunnel to the island will be completed shortly.

IT is expected the Tobique Valley Railway will be finished in July. It will be operated as a branch of the C.P.R.

THE Penetanguishene and Midland Electric Street Railway Light and Power Company (Ltd.) has obtained incorporation.

WITH the exception of a few short sections, the whole of the I.C.R. has now been re-laid with 67-pound rails.

H. M. ALLAN, Montreal, has been appointed receiver of the Manitoba and North-West Territory Railway.

THE Chignecto, N. S., Marine Transport Railway Company have not succeeded in floating their new first mortgage bonds.

IT is rumored that an American company have offered \$125,000 for the charter of the projected Kaslo-Slocan, B. C., Railway.

MR. MOUNTAIN, engineer of the Ottawa & Parry Sound Railway, is making a trip purchasing the rights of way for the road.

A NEW ferry steamer is to be built at Mount Stewart, P. E. I. It is said that the tender of Sol. C. Clarke has been accepted.

THE new ferry boat at Lardreau, B.C., has been completed. It is forty feet long and it will carry fifteen pack-horses and their loads.

CAPT. P. DIONNE has invented a six bladed wheel for steamers. It is said to increase the propelling power by more than 25 per cent.

THE steel screw steamer "Aretina" has been chartered by the Red Cross line to ply between New York, Halifax and Newfoundland.

THE C. P. R. will very likely put on a steamship to ply between Seattle and Whistler. This would materially aid their business on the Sound.

THE Canada Atlantic and Plant line are proposing to run the steamship "Florida" direct from Truro, N.S., to Hawkesbury and Charlottetown.

THE new steam-revenue cutter "Dream," having had her engines overhauled, is to patrol the St. Lawrence looking after whiskey smugglers.

THE line of the Canadian Pacific railway is being rapidly graded from Stanbridge Station towards Phillipsburg and the marble quarries near there.

THE new Canadian Pacific steamer "Aberdeen" was launched on Okanagan Lake last month. The steamer will ply between Okanagan Landing and Penticton.

A NEW steamboat line, the International Navigation Company, Toronto, are applying for incorporation. It will compete with the Richelieu Company.

THE work of repairing and refitting the engine and hauling gear of the North Sydney, C.B., Marine Railway is going on apace.

THE Bras d'Or Steam Navigation Co. have purchased the steamship "Blue Hill" for the service between St. Peter's, Irish Cove and Grand Narrows, N.S.

TURTLE CREEK bridge, on the Salisbury and Harvey Railway has been burned down. The fire is supposed to have had its source in an engine. It is being rebuilt.

WE hear that E. F. Fauquier, who has the contract for constructing the Ottawa & Parry Sound Railway, is going to sublet the portion between Arnprior and Renfrew.

CAPT. THOMAS LEACH died at Toronto a few days ago. He was for a number of years master of the steamers "Rothsay Castle" and "City of St. John."

CAPT. A. F. GARDINER, manager of the Grummond line of steamers of Detroit, contemplates running a line of nightly steamers between Port Stanley and Cleveland.

THE Grand Trunk has begun the building of a new bridge over the Otter Creek at Otterville. It will be of stone and iron, with three spans of 55 feet each, and one of 97 feet.

THE launching of the steamer "Aberdeen," constructed by the C. P. R. Co., for traffic on Lake Okanagan, put the residents of that district of B.C. in a flutter of excitement.

COMPLAINTS are often made about the inadequate accommodation for ships at St. John, N.B., and the immediate extension of the railway along the harbor front is badly needed.

THE C.P.R. are considering the question of constructing a line from Point Fortune to Caledonia Springs and Ottawa, which would considerably shorten the run from the latter place to Montreal.

THE steamer "Swan" has been inspected at Kingston with a view to her purchase for use on the Dundas, Ont., canal. She will run from Dundas through the canal to Burlington beach. Venice restored!

THE Great Northern Railway Co. are building a new boat of sufficiently light draft to run to Fort Steele in the upper Kootenay, B.C., and will try to draw business by way of Jennings to their railway.

THE Dominion line of steamers are having a new steamer built at Harland & Wolff's yards, Belfast, to surpass any ship of the line yet built. She will be 450 feet long, will cost about \$750,000, and is to be ready next spring.

CONTRACTOR R. B. Kelly, of Coquitlam, has finished his contract on the Port Moody and Westminster Junction trunk road. There is a prospect that the Westminster and Coquitlam Lake road will be put in better condition.

THE C. P. R. have a project of extending the Selkirk branch of that railway north-westward to the Lake Dauphin district by way of the Narrows of Lake Manitoba, also of a branch line to Gimli, on Lake Winnipeg.

GILLIES & Co. have received an order from the Controller of Customs to build a light steam launch for the cruiser "Coastance." Its object will be to pursue in-shore vessels of light draught suspected of having contraband goods on board. She will not draw more than thirty inches of water, and will have a speed of about ten knots per hour.

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A PIECE of flying tin thrown from a lathe machine in the Pearce Co.'s mill, at Marmora, caused a boy's death last month.

A YOUNG lad named Frank Connolly had his left hand badly crushed in Fleming's foundry at St. John the other day while working at a planer.

JOHN MASON, who recently got his hand injured in a lathe in the Goldie & McCulloch machine shop, has had to have two fingers amputated and the bones taken out nearly to the wrist.

HIRAM WOODLAND, aged 15, was cleaning away rubbish from a circular saw at Booth's mills, Ottawa, on the 8th inst., when he was caught in the chain and carried on to the saw. His legs were cut through and he only lived twenty minutes.

ONE day lately John Jackson, a melter in Laidlaw's foundry, Hamilton, was nearly suffocated. While working at the furnaces a strong blast of wind blew gas from the cupola into his lungs and he was rendered unconscious for half an hour.

WM. SANGSTER had his hand badly mangled at Sangster's sash and door factory, London, the other day. His hand came in contact with a revolving knife, the result being that the flesh of two fingers was completely torn off, while the bones were badly shattered.

THE inhabitants of Allumette Island are agitating for a bridge across the Ottawa to Pembroke.

A WOMEN'S building will be put up in connection with the general hospital at Kingston, to cost \$18,000, and to be finished by January next.

THE city of St. Thomas has decided to go on with the proposed sewer extension and the building of a new market, at a cost of several thousand dollars.

THE plans have now been accepted for the new building of the Laval University, to be erected on St. Denis Street, Montreal. Accommodation will be provided for five hundred students, and the estimated cost of the building is \$200,000.

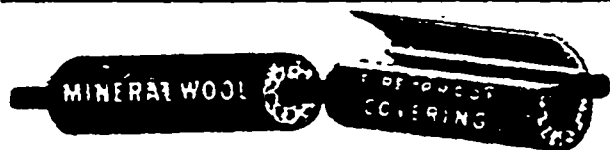
THE greater part of the Revelstoke and Arrow Lake branch of the C.P.R. has been located, and the contract will be awarded as soon as the cutting and clearing are finished.

T. C. KEEFER, C.E., Ottawa, is making an examination of the Montreal Water Works, with a view to deciding as to what improvements are necessary. He states that the steam power for pumping is insufficient, and a break-down of the present engine would be a great calamity for the city.

THE inhabitants of St. John, N.B., are talking of the advantages that town possesses for the formation of several new industries. Foremost of them would be an iron smelting establishment. Coal can be had cheaply; there is excellent iron ore close to the city, and the supply of good limestone is enormous. Agricultural implements might also be made there to supply the maritime provinces, and, besides these, there are quite a multitude of smaller industries which at St. John might very easily make a settled home.

W. S. WILLIAMS, of New York, and A. J. Corriveau, of Montreal, have at last surmounted the obstacles that stood in the way of their projected electric railway for the suburbs of Montreal. The principal line to be built this summer, the work of which is commenced, will run from Mile-End on the north-east of Montreal to the Back River (Sault aux Recollets), a distance of about seven miles. This road is to be finished by September. This company, in which some New York capitalists are interested, proposes to build some seventy-five miles additional next year.

TORONTO No. 1 Canadian Association of Stationary Engineers celebrated their sixth anniversary at their rooms in Shaftesbury Hall last month. Routine business concluded, the members spent a social evening. A. M. Wickens, the father of the Canadian association, was voted to the chair and delivered an address. A. E. Edkins, president of the Executive Board; W. Phillips, vice-president of the Toronto branch, and George Gilchrist followed with speeches, and George Grant, W. G. Blackgrove and others favored the company with some capital songs. Refreshments were served before the gathering broke up.



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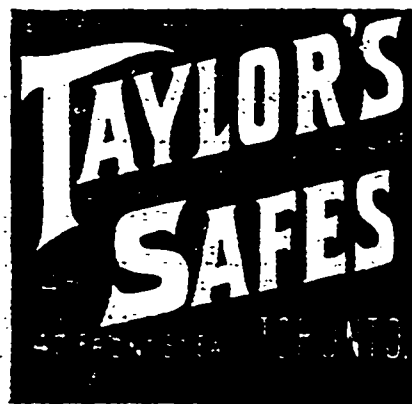
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The Fort William *Journal* says the P. A., D. & W. Railway have a temporary bridge over the Kaministiquia at Stanley to replace the one swept away by the flood. They will replace it with a better structure next winter.

Among the most interesting of World's Fair exhibits is the Norwegian Viking ship. It is 78 feet long, 16 feet wide, and 6 feet deep; it carries twelve men, and is without a deck. Either sails or oars may be used. She passes through the St. Lawrence and the Lakes.

The canal to connect Lake St. Clair and Lake Erie, referred to in last issue, seems likely to be an accomplished fact soon. C. C. Wyatt, who was one of the engineers of the Suez Canal, has the work in hand and has already secured an option on the proposed inlet of the Canal at Stony Point. It is understood that the Dominion Government will give the necessary legislation.

There is a movement among the Toronto doctors not officially connected with the general hospital to start an independent hospital, and it is proposed to form a company with a capital of \$100,000 for that purpose. The stock will be chiefly, if not exclusively, held by medical men, and the following have been appointed provisional directors:—Drs. Palmer, Ferguson, Rea, Patton, Canniff,

Nattress, Hunter, Barrick, Hamilton, Armstrong, Greene, Spence, Thompson, Johnston, Cotton, Woods.

Following the heavy rain storm of the 16th and 17th May, which broke so many mill dams, injured many factories and carried away so many small bridges in Ontario, a destructive cyclone broke over the country on the 23rd, causing great destruction of property. The Methodist Church at Aurora was damaged to the extent of \$5,000, and other damage done there to the amount of \$70,000. The wall of Tilson's elevator at Tilsonburg was blown in and A. Snively, an employe, instantly killed. The cupola of the St. Jean Baptiste school house at Ottawa was blown off, and in falling killed a little girl of 7 years. At Sandwich, Mullen & Garfield's coal dock was badly damaged; a 40-ton derrick was blown over, creating havoc to the amount of \$6,000. At Berlin, Hibner & Co.'s large furniture factory was unroofed. In Brantford the roof of Malcolm's woolen mill was lifted and blown across the street into Patterson's biscuit factory; the roof of the box factory was blown in, as was the wall of the Gould Bicycle Works. The total damage there was about \$12,000, and many other towns suffered more or less, while the wharves and dams up the Ottawa were damaged to a heavy amount.

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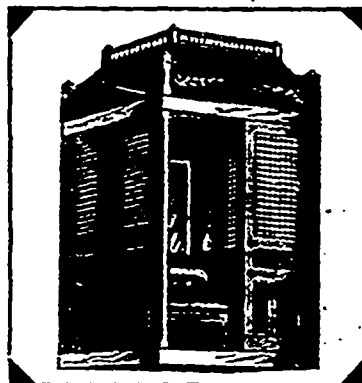
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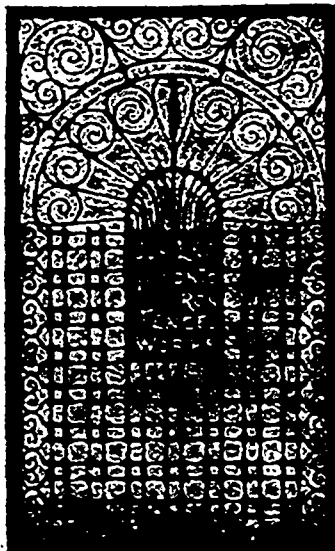


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AN ALUMINUM ALLOY.

It has been generally supposed that aluminum and antimony had but little affinity for one another, but Mr. D. A. Roche, the latest experimenter on the subject, has found a method by which they can be united with good results. The process is to fuse the two metals directly in a Perrot furnace at a low temperature. When the alloy contains less than 5 per cent. of antimony, it is hard and possesses a greater tenacity and elasticity than pure aluminum, although it is still perfectly malleable. In color it is a little less white than aluminum, but it is more silvery and of greater brilliancy. Upon an increase of the percentage of antimony the alloy becomes harder, but it also becomes more brittle, and the crystallisation which distinguishes aluminum disappears: when there is 90 per cent. of antimony, groups of separate crystals may be seen. As this percentage is increased the melting point becomes higher. The aluminum-antimony alloys are said to combine with other metals, forming more complex combinations, among which may be mentioned those with nickel and with Tungsten, so remarkable for their hardness and elasticity.

MACHINERY CASE.

In 1888, W. H. Shaver, of Hamilton, purchased from H. W. Petrie, of Toronto, an engine and boiler, on the understanding that it was to be paid for in lumber and other wooden-ware, Shaver in the meantime giving lien notes by which the property was to be considered Petrie's until settlement was made. Later on \$1,056 worth of lumber was delivered and \$100 in cash paid over. In 1889 Shaver assigned, and his wife, Mary, purchased the property, selling the engine and boiler, in 1892, to John J. Scott, barrister, of Hamilton, who bought without notice of Mr. Petrie's claim. In March, 1893, the defendant's agent seized the machine, as it had not been fully paid for. Scott brought an action for damages and to have Petrie restrained from dealing with the engine, and Petrie in his defence claimed \$500 for the detention of his engine and boiler. At the trial judgment was given for the plaintiff, but the Divisional Court reversed this. Now Mr. Petrie has brought the case before the Court of Appeal.

PLASTER of Paris figures may be made to look like alabaster by dipping them in a strong solution of alum water.

ELECTRICITY, when unretarded by atmospheric influences, travels at the rate of 288,000 miles a second. Along a wire it is, of course, vastly slower, and a perceptible period of time is occupied by the electric current in sending telegrams over long distances.

A NEW arrangement of the telephone has recently been devised for the use of divers. In place of one of the glasses in the helmet a sheet of copper is used, and to this a telephone is fixed, so that when at the bottom of the sea, the diver has only to turn his head slightly in order to receive instructions from above, or report what he sees below.

AN English engineer has devised the ingenious method of producing metallic hollowware articles by the electro-deposition of metals or metallic alloys upon suitable cores or matrices. The core may be made of wax, metal or alloy, or of India rubber, which may be inflated for the purpose of receiving the coating and deflated for removal. While electro-deposition is taking place the core is revolved in the bath in opposite directions, alternately, and is shifted endwise, the object being to produce a coating having a smooth surface. The anodes (of the metal to be deposited) are divided from the cathodes (the core) by porous earthenware partitions, through which the liquid is circulated by means of a pump.

AN English inventor has devised a belt which can be built of small pieces of leather and has great tensile strength, combined with elasticity. By the method of construction the belt can be taken up and shortened in case of its becoming too slack. In making the belt, the inventor employs a ribbon composed of strips of thin steel joined together at their ends by rivets or other suitable means. On the inner or pulley side of the ribbon pieces of leather or other material are fastened by means of rivets. Each link is curved in the direction of its length, which allows it more easily to pass around the pulleys, and insures the necessary elasticity when the links are straightened out. With large belts the necessary strength is obtained by employing more than one link placed one over the other or side by side.

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