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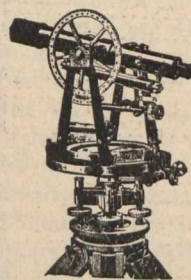
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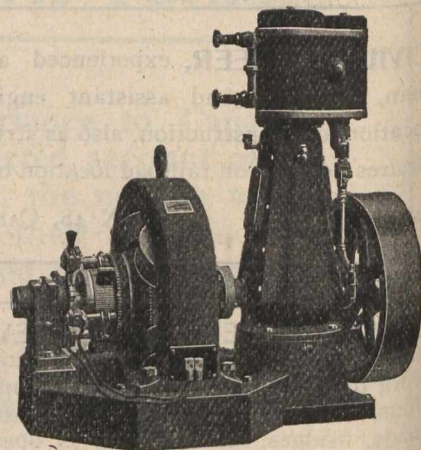
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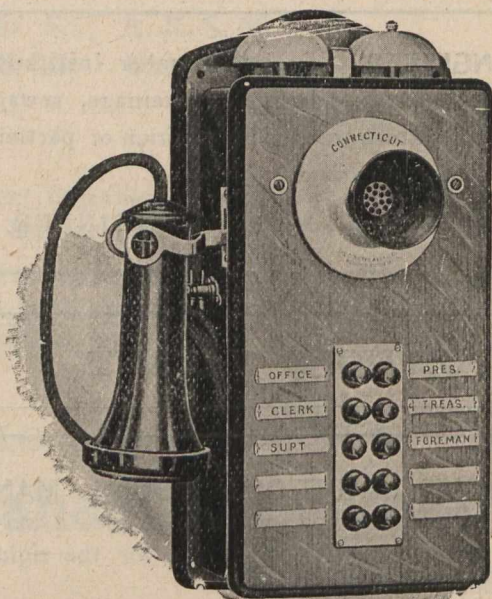
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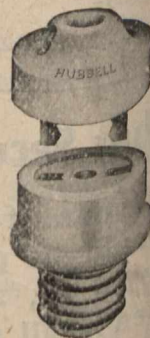
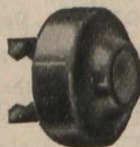
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# The Canadian Engineer

WEEKLY

ESTABLISHED 1893

VOL. 15. TORONTO, MONTREAL, WINNIPEG, VANCOUVER, MARCH 20th, 1908. No. 12

## The Canadian Engineer

ESTABLISHED 1893

Issued Weekly in the interests of the

CIVIL, MECHANICAL STRUCTURAL, ELECTRICAL, MARINE AND MINING ENGINEER, THE SURVEYOR, THE MANUFACTURER AND THE CONTRACTOR.

Editor—E. A. JAMES, B.A. Sc.

Business Manager—JAMES J. SALMOND.

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Everything affecting the editorial department should be directed to the Editor.

### NOTICE TO ADVERTISERS:

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Printed at the office of THE MONETARY TIMES PRINTING CO., Limited,  
TORONTO, CANADA.

TORONTO, CANADA, MARCH 20th, 1908.

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### NATIONAL READERS.

We understand that the Department of Education is engaged in revising the readers now in use in the public schools throughout the Province of Ontario. The time is, therefore, opportune for seeing that these readers are made much more purely National and Canadian than they have

been in the past. They are the first books to which our children have their attention directed, and though they may be intended solely as exercises in reading, they cannot escape the responsibility of, at the same time, furnishing the children with a large quantity of mental food, and of supplying their minds at the most receptive age with information—either good or bad—which will remain with them as they grow up to be men and women, and will influence their actions and ideals throughout their whole lives.

It is fully recognized that the prevalent ignorance in Great Britain with regard to Canada has made it very difficult for the British people to participate intelligently in Canadian trade and progress; but it is not so fully recognized that in many places nearer at hand the Canadians themselves are growing up in benighted ignorance of the character and extent of the resources of their own country. Now, the simplest remedy that suggests itself for this is to teach the children about our own country, and it will not be long before the men and women are alive to its possibilities. Make the children proud of our country by teaching them what it contains, and what their fathers and mothers have done to develop it, and then the necessity would never arise of appealing to the patriotism of the grown-up. It is doubtful if there is any way by which the children could be reached as easily and effectively as through the public school readers. Every line in these readers is carefully conned by them, and often the fathers and mothers are called upon to help them with their lessons. Thus, quite unconsciously, the information contained in the readers is absorbed.

We can all recall many of the stories in the old readers, such as: "A Study in Observation," where a blind camel was loaded with wheat on one side and honey on the other; "Bruce and the Spider;" "Androcles and the Lion;" "The Vision of Mirza," and many others. The public school presenting the people with moral axioms, such as some of the above stories contain, but also with accounts of interesting features and events in the life and progress of their own country, which should no longer be overlooked. In no other way can many of the dramatic elements in the life of the country be taught as easily and thoroughly as by a good selection of short stories provided in this manner for the children. The neglect of the opportunity so presented to teach the children the best that is known of their own country has been rather discreditable to us in the past, but it is to be hoped that when the new readers are published the defects of the old ones will be found to be remedied.

Of course, it is much easier to cull short articles and fragments from the English classics, and put them together in readers than it is to read through and choose from the literature referring to the farms, forests and mines of Canada as well as to its literature of truthful adventure. To make independent choice possible, subject to much adverse criticism of articles, it would be interesting and instructive, but in view of the importance of the object to be attained, the question of easier methods of preparation of the books should not be considered for a moment. There should be no hesitation whatever in authorizing the preparation of the best books possible from a Canadian standpoint. Good material is to be had in abundance if it is looked for in the right places. The life on the farms, ranches, orchards, and in the forests has been beautifully described in books and magazines over and over again. In addition to these descriptions, it may be remarked that one of the strongest characteristics by which the Nineteenth Century will be known in history will be the Arctic exploration; and many of the journeys in connection with the exploration of the North were made through Canada.



As records of heroic endeavor, the accounts of Hearne, Mac-kenzie, Franklin, Richardson, Roe, Bock, Tyrrell, and many others, equal anything that has been written in the chronicles of struggle and success in any age.

The Ontario Government has shown itself alive to the signs of the times and capable of seizing the opportunities of progress in many ways, and it is to be hoped that it will not neglect the chance of taking a long step forward in the educational equipment of its people by providing good Canadian readers for the children.

**RURAL HIGHWAYS.**

Although the management, design and construction of urban streets have reached a high standard, and is at times thought well nigh perfect, yet the improvement of country roads does not make the progress one would expect.

In the early days toll-roads were the leading thoroughfares. In many cases they were models of construction, but seldom did the municipalities make any attempt to build similar or better roads. Then came the campaign for the abolition of toll-roads. One after the other became county roads, and for a time it looked as if a county system of roads would be established, and system, skill and money would be combined in preventing waste of energy and dollars on road repair.

Just about this time the new County Council Act came into force, and the Good Roads movement did not make much progress. The township plans and county plans were hard to harmonize. At times a jealousy, not at all commendable, blocked many good programmes for road improvement.

During this time a campaign for the abolishing of statute labor was being inaugurated. Many municipalities clung to the old system, but few returned to it having once discarded it.

Recent legislation has brought the township and county councillors into more intimate connection, and county roads, and better methods, less waste of energy is sure to follow.

Poor roads are such a loss to a community that one cannot understand why people have so long allowed primitive methods to be followed in their construction and repair. Poor roads mean small loads, an increase cost for cartage, greater wear on carriages and horses and less social enjoyment in isolated districts.

Good country roads will increase so much the comforts and better methods, less waste of energy is sure to follow. the dilatory manner in which some localities deal with the matter.

**RAILWAY IMPROVEMENT IN JAPAN.**

Japan evidently intends employing all possible expedition in developing and perfecting the system of state railways. The intention is to devote thirty millions annually to this work, and an examination of the following figures make the situation clear:—

**Expenditures on Extensions and Improvements of Railways.**

|         |             |
|---------|-------------|
| 1904-5  | \$8,900,000 |
| 1905-6  | 1,820,000   |
| 1906-7  | 10,260,000  |
| 1907-8  | 29,593,000  |
| 1908-9  | 33,090,000  |
| 1909-10 | 30,180,000  |

The lines being in fairly good condition and extensions not urgent, it is probable that a large share of these appropriations will go for rolling stock and other plant of which there is a notable deficiency, nearly all of which have to be imported.

**GOOD ROADS CONVENTION.**

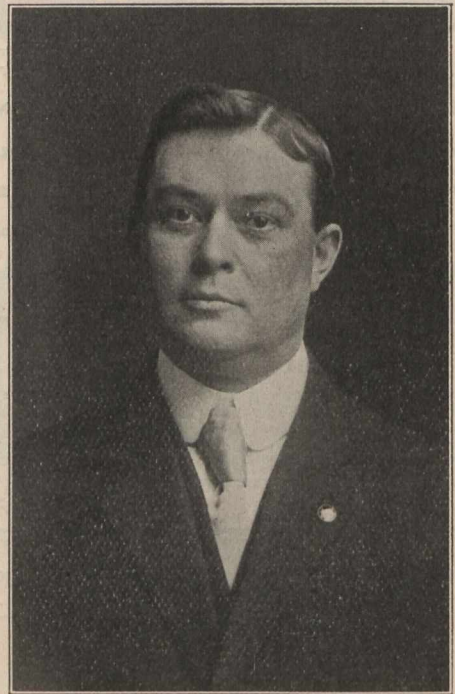
The Western Ontario Good Roads' Association will hold its annual meeting in the York County Council Chambers, Adelaide Street, Toronto, at 2 o'clock, on Tuesday, March 24th, and the following day.

**SOME SUGGESTIONS FOR THE IMPROVEMENT OF STEEL RAILS.**

A. L. Reading.\*

The writer has been requested to give a paper on "Some Causes of Recent Rail Failures," but this subject has been so exhaustively dealt with by numerous writers in the "Technical Press, during the past few years that, with the editor's permission, the writer will merely outline a few points which, after an experience of seventeen years in the manufacture of steel and steel rails appear to him to be of grave importance to the railways of the travelling public.

While by far the greater part of the blame of rail failures during recent years should be laid to the manufacturer on account of the mills endeavoring to increase the quantity, rather than maintaining or improving the quality of their output, some criticism should be made of the manner in which some of the railroads have not improved their road-beds. Some roads have given very little consideration to the quantity and quality of ballast used and quite often the foundation of the road-bed is composed simply of plain sand. After a rainfall



Mr. A. L. Reading.

the water naturally remains in the bed if the road-bed is not sufficiently elevated to afford proper drainage, and in the event of cold weather setting in the water freezes and heaves the track sufficiently to cause the rail to be rigid in some places and not rigid in others. Is it any wonder, therefore, that the heavy trains and ponderous locomotives now in use overtax the rails, especially if the rolling stock happens to have a flat wheel? The impact from the drivers of a flat wheel is something enormous. Only lately the writer was retained to report on several cases of rail failures on a piece of track in this Province, and found that no other cause could be assigned to some of the failures than flat wheels, the fractures being clean, and without defects of any kind showing. The Chemical Analysis and Drop Test proved that the rail would stand the most severe tests.

Again cross-ties also come in for a certain amount of criticism. It is not an uncommon thing to find two or three ties within a short distance of one another which are too rotten to hold the spikes, to say nothing of aiding the foundation. The strain on the rails under these conditions is tremendous and there is no doubt that a small percentage of rail failures, (to say nothing of accidents caused by spread rails), may be attributed to the support which the tie, is supposed to, but does not give.

As stated above, the steel companies in their eagerness for a greater output have sacrificed quality for quantity.

\*Manager Standard Inspection Bureau.



Blast furnaces have been run to their fullest capacity and the molten metal is taken therefrom and poured into a receiver or mixer from which it is drawn off at intervals and placed directly into the converter where the process of making the steel is carried out. In former days the practice was to run the molten material from the blast furnaces into sand, thus making what is commonly known as pig-iron. The pig-iron was then melted in cupolas and was from there placed in the converters. This gave a great advantage over present practice as the second melting gave the iron an additional opportunity to throw off impurities which were left after coming from the blast furnaces.

In the converting of the pig-iron into steel the old practice was to place the molten pig-iron in the converter in which it was given a long blow, thus preventing the metal from becoming too hot, whereas the practice of to-day is to blow the heat in several minutes less than formerly and artificial means are being used to keep the temperature of the metal as nearly normal as possible. It is evident that this not a success for when the metal becomes overheated in the converter it is very seldom that it is brought to a normal temperature at the time the pouring of the ingots begins, the result being that the ingots are piped deeply and segregation is more noticeable.

The foregoing statement in favor of old methods can be substantiated by the records of the steel companies, as under the old way of working, the percentage of second-class and piped rails was more than 50 per cent. less than it is to-day.

Greater care should be exercised in the heating of the ingots. They should be allowed to remain long enough in the soaking pits for the centres to become thoroughly solidified and the outside to be heated to a good rolling temperature. Under no circumstances should they be allowed to come to a cinder heat. This result can be accomplished by allowing the ingots to remain in the furnace a sufficient length of time to obtain the foregoing results. The flame in soaking pits should be kept as mild as possible.

When the ingot is being reduced in the blooming rolls, the reduction should be slow and gradual, so as to prevent the tearing and disarrangement of the structure of the steel. In shearing the bloom, a sufficient amount should be taken from the front end and back to clean off all raggedness, and enough more from the front end to cut off all piping, thus ensuring the balance of the bloom to be of sound material.

Before converting the blooms into rails it is the better practice to reheat them, in order to make the temperature of the blooms more regular.

The rail rolls should be so designed that the reductions made in each pass will be equalized. The rolls in use some fifteen or twenty years ago contained thirteen passes from the first roughing to the finishing pass with the result that a much closer grained steel was obtained in the rails than is obtained at the present time on account of most mills using large blooming rolls with heavy reductions in each pass, in not reheating, and in forming the rail from the bloom in nine passes instead of thirteen which, as mentioned above, was the practice some years ago.

The finishing temperature of the steel can best be regulated by specifying the temperature at which the bloom should be when entering the roughing rolls, rather than to try and regulate the temperature by the hot saw shrinkage clause which is common to the specifications of most railroads.

In the cambering of the rails great care must be taken so that when they finally cool they will be as near straight as possible, and thus reduce the cold straightening to a minimum.

If the steel companies were compelled to adopt the practice outlined above it is the opinion of the writer that failures due to the defects of manufacture would be considerably reduced.

Of course, the ideal rail is one that is very hard, thus having good wearing qualities, and yet should be elastic. This ideal can only be obtained by having the carbon high and the phosphorus very low.

The steel manufacturers now state that their ores are such that they cannot guarantee a lower phosphorus in their steel by the Bessemer process than 0.10 per cent., so that unless large deposits of purer ore are found it would appear

that the Open Hearth process will continue to gain in favor for the manufacture of steel to be used in rails. Of course, the Bessemer steel will continue to be useful for the manufacture of pipes, nails, and wire for fencing. When the steel companies universally adopt the Open Hearth process for the manufacture of rail steel, let us hope that they will not increase the units of their furnaces one hundred per cent. as has been done in many cases with the Bessemer process. The smaller the capacity of the Bessemer converter and the Open Hearth furnace, the more uniform will be the grade of steel obtained.

Railroad officials in writing specifications should embody clauses which are just as important as the clauses they are laying great stress on at present, namely, controlling the amount to be sheared from the bloom and also the temperature at which the rail should be sawed. The former clause is a very important one, but the latter, in the opinion of the writer, is of very little consequence in view of the fact that there are scarcely two mills in the country that have anywhere near the same distance between the finishing roll and the hot saw. It will therefore be seen that this clause does not obtain the results it is supposed to obtain.

In obtaining a good grade of rails a great deal of responsibility rests on the inspection. The inspector at the works should be a man who is as familiar with the manufacture of steel and the workings of the particular mill at which he is stationed as is the superintendent of the works. The railroads should see that a man with such ability is looking after their interests at the time their orders are being rolled. If this policy had been carried out in the past the railroads would have been promptly notified when the steel companies were contemplating any change which would be detrimental to the quality of the rails being manufactured. The railroad companies then could be protected and gain their point much easier than it can now be obtained.

## ENGINEERING SOCIETIES.

CANADIAN RAILWAY CLUB.—President, W. D. Robb, G.T.R.; secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

CANADIAN STREET RAILWAY ASSOCIATION.—President, E. A. Evans, Quebec; secretary, Acton Burrows, 157 Bay Street, Toronto.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.—President, J. F. Demers, M.D., Levis, Que.; secretary, F. Page Wilson, Toronto.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—413 Dorchester Street West, Montreal. President, J. Galbraith; Secretary, Prof. C. H. McLeod. Meetings will be held at Society Rooms each Thursday until May 1st, 1908.

QUEBEC BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, E. A. Hoare; Secretary, P. E. Parent, P.O. Box 115, Quebec. Meetings held twice a month at Room 40, City Hall.

TORONTO BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—96 King Street West, Toronto. Chairman, C. H. Mitchell; Secretary, T. C. Irving, Jr., Traders Bank Building. March 26th, regular meeting at Engineers' Club.

WINNIPEG BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, H. N. Ruttan; Secretary, E. Brydone Jack. Meets first and third Friday of each month, October to April, in University of Manitoba.

ENGINEERS' CLUB OF TORONTO.—96 King Street West. President, J. G. Sing; secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter month.

CANADIAN ELECTRICAL ASSOCIATION.—President, R. S. Kelsch, Montreal; secretary, T. S. Young, Canadian Electrical News, Toronto.

CANADIAN MINING INSTITUTE.—413 Dorchester Street West, Montreal. President, W. G. Miller, Toronto; secretary, H. Mortimer-Lamb, Montreal.

NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.—President, R. McColl; Secretary, S. Fenn, Bedford Row, Halifax, N.S.



# LEGAL NOTES.

[This department will appear in the third issue of every month. Should there be any particular case you wish reported we would be pleased to give it special attention, providing it is a case that will be of special interest to engineers or contractors.—Ed.]

## IMPAIRMENT OF LIGHT.

**Simpson vs. T. Eaton Co.**—The plaintiff was the owner of house No. 46 Albert Street, Toronto, holding the same by continuous title running back to 8th November, 1871, at or about which time the house was erected. In 1906 the defendant Company, having purchased lands immediately adjoining to the west, proceeded to erect a warehouse, and the plaintiff brought action, claiming the right to enjoy access of light as it was enjoyed on the 8th November, 1871, and to restrain defendants from interfering with same. The defendants contended that the access of light had not been interfered with to any actionable extent.

Evidence showed that the erection of the warehouse had not caused the loss of tenants nor necessitated reduction of rent, and that no business was interfered with, as the house was a dwelling-house only. True, some of the windows were darkened, but not to any considerable extent, and sufficient light still came through for the occupants of the house. The court found that the erection of the new building had not resulted in any material impairment of light. As the obstruction has caused **no substantial damages** by reason of discomfort or inconvenience, the plaintiff's only hope of success is on the ground of loss of rent. But the rent has not been reduced. Action dismissed. 10, O.W.R., 215.

## RIGHTS OF A RIPARIAN OWNER.

When a man buys land on the bank of a river or lake what rights does he acquire in the soil forming the bed of the river? Has he any greater rights than the general public who navigate the stream, and, if he has, do those rights amount to ownership of the soil beneath, or do they merely entitle him to certain benefits that may be reaped from the adjacent water, over and beyond the right of navigation?

**Keewatin Power Co. et al. vs. Town of Kenora.**—The Keewatin Power Company had obtained a grant from the Crown of certain lands near the town, on the west bank of the Winnipeg River, and the Hudson's Bay Company, joint plaintiffs, held the land similarly situated on the east bank, when the town instituted proceedings for the expropriation of the lands of both companies. In neither case did the Crown patent make any mention of the bed of the river, which, though not large, was a navigable stream. The plaintiffs brought action to restrain the expropriation proceedings, but finally consented to the town acquiring the properties, but asked for a declaration of certain rights which they asserted in the bed of the watercourse, and in the water power which might be developed, and they sought to prevent the town from carrying on works designed for the development of such water power.

It has heretofore been considered law that the river bed of navigable streams remained vested in the Crown unless the patent expressly granted the same to the locatees; and it transpired in this case that the town of Kenora had, in 1905, and subsequent to the patents to both plaintiff companies, obtained a lease from the Ontario Government of the bed of the watercourse in question. Such was the position when the opinion of the courts was sought; and the trial judge, basing his judgment on the distinction

between navigable and non-navigable streams, held that the companies owned the soil to the margin of the stream, and they did not own the soil beyond, forming the bed of the river, but had only limited rights as being the riparian owners.

The Court of Appeal has now decided that the question is not one as to whether the stream is navigable or not, but as to whether the stream is tidal or non-tidal. They conclude upon the law and upon the construction of the instruments in evidence that the plaintiff companies are **entitled to the soil forming the bed of the stream** to the middle thread, each one on his own side. Judgment delivered accordingly. 11, O.W.R., 266.

The Ontario Legislature in 1792 (and most of the other Provinces have since) enacted that the Common Law of England should apply here unless and until some statute is passed to the contrary. Now, the Common Law was formulated in England, where streams are mostly small and insignificant, whereas inlets of the sea are numerous, and the distinction thus came to be tidal and non-tidal.

Our courts have been somewhat slow to apply the English precedents, inclining to hold that some different rule must be found to govern in the case of our great inland waters. However that may be, the present case stands out clear-cut and strong; and if a man buys land on the margin of Lake Superior or the St. Lawrence River, he owns the adjacent river bed to the middle of the stream, unless the patent expressly reserved the river bed to the Crown, or other reasons be shown. The decision clears up a mooted point as to the present state of our law.

Where the stream is small and non-navigable, there never has been any doubt; the riparian owner has always held the river bed. Where the stream becomes navigable, he is **prima facie** owner of the soil, but *prima facie* only, for the contrary may be shown; and where the waters become tidal a similar presumption exists in favor of the Crown; i.e., the soil beneath is presumed to be vested in the Crown until the riparian owner clearly proves that it was included in the grant to him. Thus it appears that the grantee along the lake front may take not only the sand or stone that washes up on the shore, but may follow out and use whatever he can recover from below the water. When a case comes up affecting the Great Lakes or such a river as the St. Lawrence, questions of public safety, commerce and defence will arise, and one of the judges feels constrained to remark that there is little doubt a distinction will be drawn; but at present there is no decision to that effect, and they stand in the same category as all other inland waters.

## ENDANGERING LIFE BY FAILURE TO MAINTAIN A BRIDGE—COMPANY IS CRIMINALLY LIABLE.

**King vs. Union Colliery Company.**—The defendant corporation held a charter under the laws of British Columbia for the purposes of owning and operating coal mines. Their principal point of operation was situated at Union, B.C., and from there they ran a tramway about ten miles to the wharf at Nanaimo, where their coal was shipped. Upon this tramway they used locomotives, and had for some years been carrying passengers as well as freight, although their charter said nothing of any power or right to carry passengers. In the course of the ten miles the railway crossed the River Trent by means of a trestle and a Howe truss bridge, erected some years prior, and having a span of 133 feet. Such was the condition of affairs on 18th August, 1897, when a train in crossing the bridge broke through, and some six or seven persons on board were dashed to death below.



The Company were indicted for neglect to avoid endangering human life, and the jury found that the accident was due to rottenness of timbers in the bridge, which had not been kept in proper repair. Had it been an individual responsible for similar loss of life, there would have been no question as to liability; an indictment for manslaughter would have succeeded, whereas a corporation, not having any physical, but only a mental existence, cannot be guilty of murder or manslaughter; further, had it been an individual, there would have been no question as to the punishment. A verdict of criminal negligence to avoid endangering human life was recorded against the Company under Sec. 213 of the Criminal Code of Canada. Now, a company having no physical existence cannot be imprisoned, and no other punishment was provided by the Statutes. The court held that the Common Law of England being in force in Canada, the Common Law punishment was applicable, and imposed a fine of \$5,000. From this judgment the defendants appealed to the Court of Appeal for British Columbia, and then to the Supreme Court of Canada, but without success, both courts affirming the decision. Can. S.C.R., 31.

#### TENDER FOR LAND—ONE PARTY TO ACQUIRE AND DIVIDE WITH THE OTHER.

**Canadian Pacific Railway Co. vs. Grand Trunk Railway Co.**—Both Companies were anxious to acquire a block of land in Toronto offered for sale by the Ontario Government, and containing some nineteen acres of land, forming the apex of a triangle where the lines of the two Companies came together. By agreement made in the course of correspondence, and consequently not over explicit as to details, it was agreed that the defendants should tender for the whole, and on obtaining same should convey one-half to the plaintiffs, who would refrain from tendering. This division was to be made according to a line drawn through the property from east to west, and the plaintiff Company was to have the northern half.

The Grand Trunk Railway put in their tender as per agreement, and acquired the land, but unexpectedly the Government reserved some two acres at the north-west corner. This was out of the part which, according to a sketch prepared beforehand, was to be the property of the plaintiffs. The plaintiffs then tendered the defendants one-half of the purchase money and demanded one-half of the lands actually acquired. This the defendants refused to do, but offered the balance of the northern one-half as shown on the sketch.

The court held that the agreement was an agreement to share equally; consequently the C.P.R. is entitled to one-half of the land actually acquired, and not only to the balance of the northern one-half, as shown on the sketch. Can. S.C.R., 39-220.

#### FENCING OF RAILWAY—ANIMALS AT LARGE.

**Carruthers vs. Canadian Pacific Railway Co.**—The plaintiff was a farmer and property owner in the Province of Manitoba, and his pasture land fronted on the south side of a highway, while to the north of the highway was another field and the defendants' railway line, which ran parallel with the highway. The plaintiff's horses strayed from his pasture, crossed the highway into the field on the north and immediately adjacent to the railway line. From this field they wandered on to the tracks through an opening in the fence, which had never been provided with a gate, and were killed by a passing train. The plaintiff brought action for the price of the horses killed, claiming that they were at large, they got on to the railway and were killed through the negligence of the defendant Company in not fencing their line. The court found that this is for all loss and damage resulting from any neglect to fence their lines and maintain such fencing. Held, that the Company is liable notwithstanding that the animals got upon

the track at a place other than a railway crossing. Can. S.C.R., 39-251.

#### EASEMENT FOR DRAINAGE—COMPENSATION TO LOCAL OWNERS.

**Rhodes et al vs. Township of Raleigh.**—The plaintiffs were the owners of certain farms through which the township of Raleigh, in exercise of powers under the Municipal Drainage Act (Ontario), constructed an artificial water-course, commonly known as the Raleigh Plains Drain. Great numbers of adjoining ratepayers were, of course, benefited by the work, but to plaintiffs, whose land lay higher and was not in need of drainage, the undertaking was a detriment only, and they applied to the courts for compensation on the grounds that certain of their lands had been taken for the new channel, and yet more had been rendered useless by the dumping of excavated earth.

The court found there were two questions to determine: First. What legal injuries were done to the property affected. Second. What is the rule or scale by which the amount of compensation can be fixed. As to the first, there was little dispute; land had been taken for the actual drain, and other land on the bank had been so covered with earth as to be useless for agriculture; but the question of compensation was more intricate. The defendant township had rights to construct the drain through such lands as deemed necessary, but had not expropriated the channel thus created. The municipality, on behalf of those petitioning for the drain, acquired a substantive right of entry upon, user of, and easement over the lands occupied with the works, although the soil did not become vested in the municipality; in other words, title to the soil was not taken from the owners, yet the right of user and easement acquired by the township is protected from the invasion or obstruction so long as the drainage work exists. Thus, while still owning the soil, the plaintiffs were indefinitely deprived of the beneficial use.

In view of this fact the court holds that the easement acquired amounts substantially to a "taking" or "expropriation," and, therefore, the plaintiffs are entitled to recover full market value for the acreage of which they are thus deprived. And as to the adjoining area covered with earth, the compensation should be based on depreciation in value, which the court estimates at one-half. The plaintiffs, therefore, recover **full value for the land used** and occupied for the actual drain or excavation, and **one-half market price of the land used for dumping.** 2 C. & S. Drainage Cases, 141.

#### NEW ENGLISH LOCOMOTIVES.

Three British railway companies have lately added locomotives which possess special features to their equipment. The new four-cylinder six-coupled express engine on the London and South-Western Railway is one of these new engines which contains many distinct novelties in British locomotive practice. For shunting work at the new concentration yard of the Great Central Railway Company at Wath the most powerful tank engine ever built in this country has just been completed. This engine weights 96.2 tons; while the new engine of the Great Western Railway weighs 97.25 tons and the tender 45.75 tons. But probably the most interesting feature of these three engines, each designed independently by different locomotive engineers, is that they have all been built on the simple multiple cylinder plan. They are all designed for comparatively high boiler pressures for simple engines. The two tender engines each have four high-pressure cylinders, whilst the tank engine has three single expansion cylinders placed in line below the smoke-box. There seems to be no doubt that compounding in locomotives is not gaining ground in England; in fact, at the present time only two English railways are employing compound engines to even a moderate extent. Yet on the Continent compounding and the use of superheated steam continue to make steady progress.



### SPECIFICATIONS FOR CEMENT SIDEWALKS.

The following specifications for cement sidewalks was presented at the convention of the National Cement Users' Association, held at Buffalo, January 21-23, by the Committee on Sidewalks, Streets and Floors.

The ground base should be made as solid and permanent as possible. Where excavations or fills are made, all wood or other materials which will decompose should be removed and replaced with earth or other filling like the rest of the foundation.

Fills of clay or other material which will settle after heavy rains or deep freezing should be tamped solid in layers not more than 6 inches in thickness, so as to insure a solid embankment which will remain firm after the walk is laid.

Embankments should not be less than 2½ feet wider than the walk which is to be built. When porous material, such as coal ashes, granulated slag or gravel, is used, under drains of agricultural tile should be laid to the curb drains or gutters so as to prevent water accumulating and freezing under the walk and breaking the blocks.

The position of shade trees should not be less than 4 feet from the walk. Carolina poplar, elm or shade trees whose roots run near the surface of the ground should not be less than 10 feet from the walk.

Lines and grades should be given by a civil engineer; the stakes to be not over 25 feet apart and far enough from the walk line so that an inspector may see that the walk is laid to line grade.

The mold strips should be firmly blocked under the ends of the centre of the strips and carefully straight-edged, care being taken that the strips are parallel with the engineer's line and the height of the grade stakes. The walks should be laid with a drop of ¼-inch to the foot toward the curb gutter.

The thickness of the walk should be determined by the location, the amount of travel and danger of being broken by heavy bodies falling on it, or frost.

Business front walks should not be less than 4 inches thick and can be 6 inches with profit. The top coat of business walks should not be less than 1¼ inches thick.

In residence districts the top coat should not be less than 1 inch wearing thickness, and the thickness for different widths of walks should be as follows:—

Six feet wide, the minimum at the centres should be 4½ inches thick; at the edges, 4 inches thick.

Five feet wide, the minimum at the centres should be 3¾ inches thick; at the edges, 3½ inches thick.

Four and one-half feet wide, the minimum at the centres should be 3¾ inches thick; at the edges, 3½ inches thick.

Four feet wide, the minimum at the centres should be 3½ inches thick; at the edges, 3 inches thick.

All other widths, the minimum at the centres should be 3½ inches thick; at the edges, 3 inches thick.

Size of blocks may be determined by the width and thickness of the walk. Business front walks should contain not over:—

- 12 sq. feet when the walk is 4 inches thick.
- 16 sq. feet when the walk is 5 inches thick.
- 20 sq. feet when the walk is 5½ inches thick.
- 25 sq. feet when the walk is 6 inches thick.

Residence districts, where the walks are:—

6 feet wide, 5 inches thick at the centre, the blocks should not be over 6 feet or less than 4 feet long.

6 feet wide, 4½ inches thick at the centre, the blocks should be not over 5 feet or less than 4 feet long.

5 feet wide, 4½ inches thick at the centre, the blocks should not be over 5 feet or less than 4 feet long.

5 feet wide, 4 inches thick at the centre, the blocks should be not over 5 feet long, or less than 4 feet long.

4½ feet wide, 4 inches thick at the centre, the blocks should be not over 4½ feet or less than 3 feet long.

4 feet wide, 4 inches thick at the centre, the blocks should be not over 4 feet or less than 3 feet long.

4 feet wide, 3½ inches thick at the centre, the blocks should be not over 4 feet or less than 3 feet long.

Other widths less than the above 4 inches thick at the centre the blocks should be not over 4 feet or less than 2½ feet long.

Other widths less than the above 3½ inches thick at the centre the blocks should be not over 3½ feet or less than 2½ feet long.

**Concrete.**—Bottom coat gravel. The largest size to be not over 1 inch and all under ½ inch to be considered sand. Proportions to be one part high-grade Portland cement to four parts clean hard gravel, and sand enough to fill the voids, which makes the proportions, as most gravel will measure, after being filled with sand, 1 part cement to 5 of the whole aggregate sand and gravel.

**Bottom coat crushed stone.**—The size of broken stone should not be larger than ¾-inch and vary in size to ¼-inch and free from fine screenings and dust or soft stone. Proportions to be 1 part high grade Portland cement, 2 parts clean and sharp sand, and 4 parts broken stone, or what is termed by consulting engineers and concrete experts as 1 cement to 4 of stone, and sand enough to fill the voids.

Mixing of both gravel and broken stone should be done by placing stone in the mixing box or on the platform first, then spread the sand evenly over the stone and in like manner the cement over the sand. Then cut through from top to bottom in thin slices, which will insure an even mix. Then turn with hoe or shovel twice before adding water, which should be done with a sprinkler and hoed over as sprinkled. The batch should be turned at least once after the water is applied. The amount of water used in the bottom coat should be only enough to make it, when firmly tamped, solid and not quaky.

**Top coat.**—Three parts high grade Portland cement and 5 parts clean, sharp sand mixed dry and screened through a No. 4 sieve. In the top coat the amount of water used should be just enough so that the surface of the walk can be tamped, struck off, floated and finished within twenty minutes after it is spread on the bottom coat, and when finished it should be solid and not quaky.

An edger not less than 1 inch radius should be used on the outer edges of the walk.

Separation of the blocks should be done with a spud not over 6 inches wide and ¼ inch thick, and to insure complete separation the groove should cut through into the ground base. Fill the groove with dry sand before the top coat is spread and the top coat should be cut through to the sand after floating and troweling and a jointer run in the groove, then again draw a trowel through the groove so as to insure a complete separation of the blocks.

The protection of newly finished walks from storms can be accomplished by covering with roofing paper or canvas. Canvas should never be laid on the walk, but stretched over on a slant so as to run the water off.

Grading after the walks are ready for use should be on the curb side of the walk 1½ inches lower than the walk and not less than ¼ inch to the foot fall toward the curb or gutters. On the property side of the walk the ground should be graded back at least 2 feet and not lower than the walk, which will insure the frost throwing the walk alike on both sides.

### CANADIAN FORESTS.

Senator Baird has given notice that he will move the following resolution in the Senate on March 24th:—"That in the opinion of the Senate it is advisable that a commission be appointed, consisting of representatives from the different Legislatures of the several Provinces, together with such other persons as may have the management of the Crown Lands of Canada, with power to report on the best means to adopt for the preservation of our forests in the best interests of Canada, in view of a large amount of logs and pulpwood that are annually exported from Canada."



# CORRESPONDENCE.

[This department is a meeting-place for ideas. If you have any suggestions as to new methods or successful methods, let us hear from you. You may not be accustomed to write for publication, but do not hesitate. It is ideas we want. Your suggestion will help another. Ed.]

## VERTICAL CURVES.

It is customary to use vertical curves at all changes of grade where the algebraic difference of the two grades exceeds 0.20.

On summits the rate of change per 100 feet should not exceed 0.20.

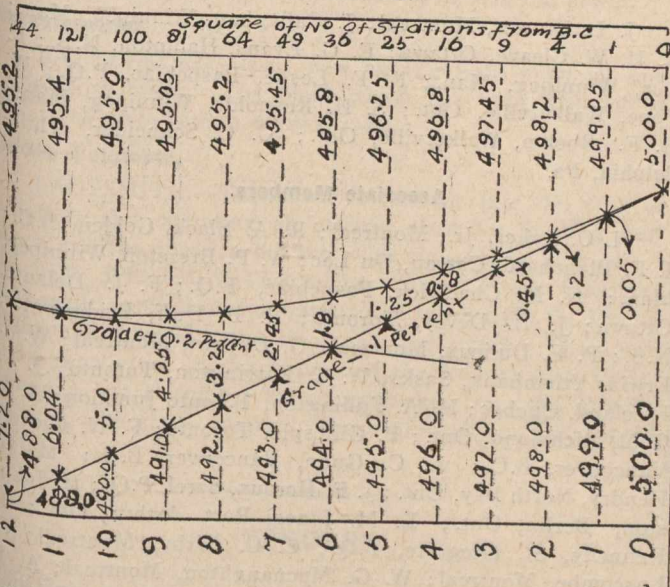
In sags the rate of change per 100 feet should not exceed 0.10.

Let L = length of vertical curve in stations of 100 ft.

" a = algebraic difference of the two intersecting grades.

" b = permissible rate of change per station.

$$\text{Then } L = \frac{a}{b}$$



Let A = algebraic difference between the rates of grade × 100

" O = required ordinates (each a fractional part of A).

" N = number of stations squared, from the B. C. of curve.

" M = length of curve in stations squared.

$$\text{Then } O = \frac{N}{M} \times A$$

**Note.**—Half of curve goes on each side of vertex, consider the plus of a station as a decimal. As the ordinates of vertical curves are constant, whatever the rate of per cent. of the two intersecting grades, it is only necessary to calculate the length of the curve and then take the ordinates from the table. Intermediate values can be found by interpolation, thus—for 125 feet the ordinate would be between 0.07 at 120 feet, and 0.10 at 140 feet, or 0.07 added to the fractional difference of the two, in distance multiplied by the difference of the two ordinates = 0.07 + (5-20 of .03) = 0.07 + .0075 = .0775. The ordinate values added to the elevation of the intersecting grades at the point under consideration is the elevation of the curve.

**Example.**—Let two intersecting grades be -1.0 and + 0.2 respectively. Find length of curve and also the ordinate at station .2.

**Solution:**—  
 a = -1.0 and + 0.20 = -1.20.  
 b = for sags 0.10.  
 L = 1.2 ÷ 0.1 = 12.0.

Station 2:—  
 A = 1.2 (12 ÷ 2) = 7.2.  
 M = 12<sup>2</sup> = 144.  
 N = 2<sup>2</sup> = 4.  
 O = 4 ÷ 144 = 0.2 ft.

Yours truly,  
 John H. Devey.

Toronto, March 9th, 1908.

## MAGNESIA IN CEMENT.

Sir,—“The information on ‘Magnesia,’ would say magnesia is an ingredient about which there was a considerable scare a few years ago, when the failure occurred at the Aberdeen Harbor works. The disintegrated cement and the white deposit found in the work that failed were analysed, and the latter was found to consist largely of magnesia; the conclusion formed therefrom was that the magnesia in the cement was responsible for the trouble. The magnesia was deposited in an inert form from the sea water, the reaction being that the sea water dissolved a certain amount of lime from the cement, and the solution of lime thus formed immediately precipitated the magnesia contained in the sea water.”

An excess of magnesia is not desirable, and as regards this ingredient in Canadian cements, would say that the average would be from 2 per cent. to 3 per cent. It is, of course, preferable that a cement should not contain more than 3 per cent., and the less the better. The reason why magnesia of considerable amount is dangerous, is that it needs a much higher temperature than lime to enable it to combine with the acid ingredients, and therefore an excess is generally in a more or less uncombined state.

Magnesia does not bother Canadian manufacturers, though if one refers to analysis and fineness which will appear through your columns, it would easily be seen that fine grinding (pulverizing) say 96 per cent. on 100 mesh screen would help in getting rid of this harmful ingredient; as it would go into thorough incorporation with the acids and thus be rendered innocuous. “The writer was connected a few years back with a factory that turned out a cement containing as much as 5 per cent. of magnesia, and though being 1 per cent. higher than the British Standard Specification, had a good demand.”

Yours truly,  
 J. H. P. Wood,  
 Owen Sound, Ont.

March 16th, 1908.

## CONCRETE SIDEWALK.

The following letter was addressed to a town engineer who has turned it over to us for publication, hoping that a discussion on foundations may result. Elsewhere in this issue we give the specifications for cement sidewalks as approved of at the Buffalo Convention.—Ed.

Sir,—With reference to the construction of cement walks I beg to offer a few suggestions for your consideration and also for any engineer whom you may employ.

I would here remark that it is not with a view of present or future benefit that we might derive from the adoptions of the suggestions that I make them. The ideas are not new for I have for some years been advocating them, among others, with a view to the elimination of unnecessary and totally theoretical rules in this work of construction of cement walks.

You already know my ideas as to this so-called foundation. The view that one should excavate and leave a hole



filled in loosely with stones which will enable water to lie in amongst them to freeze, is really too ridiculous to need any reputation from any man who will seriously think what he is inserting in a specification.

If the money or rather a part of it that is now spent on stone to bury so needlessly, would be used to level off the ground where the proposed walk should lie, it would be wise, for consequently it would not present an uneven surface, where water could lie in patches, then put on sand or a little stone, anything to keep the cement from coming in contact with the clay, then  $3\frac{1}{2}$  inches concrete, 6—3—1 is plenty strong, and a top of 1 inch of 2 to 1, the latter to run down the face of the outside 5 inches to the thickness of a feather-edged board.

One more suggestion, and the most important. The concrete curb or face of a walk should not run any further down the front than would be necessary to show a finished appearance from the road; say two inches below the road surface. This would enable water that has accumulated under the walk, or is passing from the back of the walk from lawns, etc., to seep freely away and clear of the walk. As at present owing to the curb going so deeply, this water is imprisoned till it should seep lower than the curb, consequently freezing before that depth is reached.

To provide for expansions, besides the ordinary joints, an opening at least one inch wide should be left clear through the top and concrete course every 100 feet.

I respectfully submit to you these views as I have to many other engineers, and they all agree to the logical proposals but unfortunately custom is hard to overcome.

You can by adopting them have more walks constructed in your town at the same cost as a smaller number under the old time-worn theoretical specifications, and better ones, too, not liable to heave and crack through frozen water underneath.

For twelve years I have worked solely at this work, and to it I have given my best reasoning and thought.

Further information I will be only too pleased to furnish.

Yours faithfully,

March, 1908.

## SOCIETY NOTES.

### Engineering Society.

The Engineering Society of the Faculty of Applied Science of Toronto University held their annual elections last Friday night, when the following officers were elected for the year 1908-9:—President, H. V. Marshall; vice-presidents, W. J. Boulton, L. R. Wilson, A. D. Campbell; graduates' representative, T. H. Hogg; fourth year representative, J. P. Charlebois; third year representative, T. H. Crosby; second year representative, A. H. New; assistant secretary, W. J. Amsden; recording secretary, F. D. Clark; corresponding Secretary, F. A. Robertson; treasurer, F. H. Chesnut.

### APPLIED SCIENCE UNDERGRADUATES, MCGILL.

The Applied Science Undergraduate Society held its regular meeting on Wednesday evening. Since its reorganization this society has been an important medium for the discussion of modern engineering topics.

At this meeting, D. E. Blair, B.Sc., presented a paper on "Electric Traction." Mr. Blair being superintendent of rolling stock for the Montreal Street Railway, has had much experience on the subject about which he was speaking and treated it in a very practical and logical manner. The discussion which followed showed that the speaker was understood and appreciated. Prof. Herdt, of the University staff, was present and took part in the discussion.

The new executive comprising the following then took their places:—President, J. A. DeLancey; vice-president, G. W. Smith; secretary, A. C. G. McLeod; treasurer, J. E. Daubney; reporter, W. H. Powell.

They hope to be able to get many good lectures for next year, and if their lectures are nearly as interesting and instructive as those given by Mr. Murphy last month, and Mr. Blair this month, they will be productive of much good.

## CANADIAN SOCIETY OF CIVIL ENGINEERS.

A special meeting of the Canadian Society of Civil Engineers was held in the society's rooms, Dorchester Street, Montreal, on the evening of the 12th inst., Prof. Galbraith, president, in the chair. The other members of the Quebec Bridge Commission were present, together with a large attendance of the Society. The meeting was called to consider the granting of a contribution of \$500 towards making the Quebec tercentenary a success. The matter was discussed at some length, and the opinion of the Society's counsel, in which he stated that the Society could not legally vote a contribution of this nature from its funds, was reported. As a result, it was decided to communicate with the various members asking for private contributions for the object stated.

Balloting then took place upon the election of members, with the result that the following were admitted:—

### Members.

J. L. Brower, Montreal; J. Callaghan, Winnipeg, Man.; A. H. W. Cleave, Ottawa; E. G. Evans, Hampton, N.B.; F. Lee, Winnipeg, Man.; R. F. Leslie, Paspebiac, P.Q.; W. Pope, Walkerville, Ont.; S. H. Reynolds, Winnipeg, Man.; G. E. Roehm, Walkerville, Ont.; C. C. Schneider, Philadelphia, Pa.

### Associate Members.

H. C. Baker, Jr., Montreal; R. A. Black, Golden, B.C.; J. F. Blanchard, Coteau, Du Lac; W. P. Brereton, Winnipeg, Man.; K. M. Chadwick, Paspebiac, P.Q.; F. J. Delaute, Ottawa; J. H. Devey, Toronto; P. B. Duff, Bridgewater, N.S.; P. E. Dulieux, Montreal; G. Dupont, Montreal; W. J. Erwin, Ythanbank, Sask.; W. C. Farrington, Toronto; J. A. Freeland, Quebec; M. A. Fullington, Toronto Junction; A. J. Gaul, Richmond, Ont.; P. Gillespie, Toronto; F. W. Glover, Vancouver, B.C.; L. C. Gunn, Vancouver, B.C.; M. C. Hendry, North Bay, Ont.; J. P. Heroux, Sorel, P.Q.; H. Johnston, Berlin, Ont.; L. M. Jones, Port Arthur, Ont.; J. Kennedy, St. Gregoire, P.Q.; C. C. Kirby, Montreal; C. Luscombe, Montreal; W. G. Macnaughton, Montreal; A. J. Meyers, Montreal; E. T. Mug, Montreal; J. C. Mulville, Kenora, Ont.; L. G. Read, Montreal; G. H. Reed, Parry Sound, Ont.; G. F. Richan, Dryden, Ont.; J. W. Seens, Walkerville, Ont.; F. H. Shepherd, Nanaimo, B.C.; L. E. Silcox, Edmonton, Alta.; W. E. Stewart, Revelstoke, B.C.; J. Taylor, Weymontachingue, P.Q.; E. C. Warren, Montreal; J. D. Whitmore, Moose Jaw, Sask.; W. McL. Wilkie, Toronto.

### Associates.

E. R. Case, Toronto; R. S. Smart, Ottawa.

### Transferred from the Class of Associate Member to that of Member.

J. M. R. Fairbairn, Montreal; R. M. Hannaford, Montreal; J. G. Legrand, Montreal; J. V. Nimmo, Montreal; W. H. Shillinglaw, Brandon, Man.

### Transferred From the Class of Student to That of Associate Member.

G. E. Bell, Montreal; W. P. Caddell, Newburgh Junction, N.B.; F. Cowans, Cerro de Pasco, Peru; D. C. Findlay, Calgary; E. C. Goldie, Toronto; G. T. Jennings, Toronto; G. G. Hare, Kingston; J. F. Murphy, Ottawa; P. J. B. O'Sullivan, Indian Lorette, P.Q.; J. G. Reid, Winnipeg; H. B. Sims, Moose Jaw, Sask.; A. R. Sprenger, Cap Rouge,

(Continued on Page 207.)



# CONSTRUCTION NEWS SECTION

Readers will confer a great favor by sending in news items from time to time. We are particularly eager to get notes regarding engineering work in hand and projected, contracts awarded, changes in staffs, etc. Printed forms for the purpose will be furnished upon application.

## LIGHT, HEAT, AND POWER.

### Ontario.

**HAMILTON.**—Judge Snider's award in arbitration by which the city endeavored to force the Cataract Power Company to reduce the cost of arc lights from \$85, has been made public. The judge orders a reduction of \$15 on each lamp, dating from 1905, which amounts to a reduction of over \$16,000. The reduction continues for the balance of the contract, which expires in July of next year. Engineers Sotham and Gaby, of the Hydro Commission, were the men on whose evidence the city secured the reduction.

**TORONTO.**—The Ontario Power Commission have received the city's application for 10,000 horse-power. This with the other applications on hand totals some 27,000 odd horse-power, the Commission has been requested to furnish. Appended to the city's application is a note enquiring when the Commission will be in a position to furnish the power.

### Saskatchewan.

**BATTLEFORD.**—The new electric light plant is now in working order. The plant which has been installed is said to be up-to-date in every respect.

### British Columbia.

**LADYSMITH.**—This town is looking into the cost of installing and operating an electric plant for lighting purposes, and the question has met with approval on all sides.

**NEW WESTMINSTER.**—The Sunset Power Company have made application for water to be taken from the Quanli River, and to be returned at or near the mouth. The application recalls the similar request of the International Power Company last December for 20,000 inches from the Tomihy Creek in the same district, whose proposition was turned down.

## TENDERS.

### Ontario.

**GLACE BAY.**—Tenders, endorsed "Tender for Glace Bay Road Protection Work," will be received until Tuesday, March 24th, 1908, for the construction of a Road Protection Work at Glace Bay, Cape Breton County. E. G. Millidge, Resident Engineer, Antigonish, N.S.

**TORONTO.**—Tenders will be received for Toronto Island Breakwater Extension until April 24th, 1908. J. G. Sing, Resident Engineer, Toronto. (Advertised Canadian Engineer).

### Saskatchewan.

**MOOSE JAW.**—Tenders will be received until March 23rd, for the erection of a court house building here. F. J. Robison, Deputy Commissioner of Public Works, Regina.

### Alberta.

**EDMONTON.**—Tenders will be received up to the 10th day of April, 1908, for the construction of a 70-mile wire fence around Buffalo Park, situate in Townships 42, 43, and 44, Ranges 6, 7, and 8, in the Province of Alberta. H. Douglas, Commissioner of Dominion Parks, Edmonton.

### British Columbia.

**VICTORIA.**—Tenders will be received up to the 30th day of March, 1908, for the supplying of certain water meters, as per specification, copies of which can be obtained at the office of the purchasing agent, City Hall, Victoria, B.C. Wm. W. Northcott, Purchasing Agent, City Hall, Victoria, B.C.

### New Brunswick.

**FREDERICTON.**—"Tenders for Apohaqui Bridge" Substructure, will be received at the Department of Public Works, Fredericton, until the 23rd day of March, 1908, for building the concrete substructure and approaches of Apohaqui Bridge over Kennebecasis River, King's County, N.B. C. H. LaBillois, Department Public Works, Fredericton.

**FREDERICTON.**—"Tenders for St. Jacques Bridge" Substructure, will be received at the Department of Public Works, Fredericton, until Monday, 23rd March, 1908, for building the concrete substructure and approaches of St. Jacques Bridge, Madawaska County, N.B.

**FREDERICTON.**—Tenders will be received until March 23rd, for building Mill Creek Mouth Bridge, Albert County. C. H. LaBillois, Department Public Works, Fredericton.

**FREDERICTON.**—Tenders will be received at the Department of Public Works, Fredericton, until Monday, 23rd day of March, for building the concrete substructure and approaches of Apohaqui Bridge over Kennebecasis River, King's County. C. H. LaBillois, Department Public Works, Fredericton.

**HILLSBORO.**—Tenders will be received until March 23rd for building Mill Creek Mouth Bridge, Albert County. C. H. LaBillois, Department of Public Works, Fredericton.

### Manitoba.

**WINNIPEG.**—Tenders addressed to the Chairman of the Board of Control here for supply of turbine pump of 2,500,000 imperial gallon capacity, with electric motor for City Water Works, will be received until Tuesday, March 24th, 1908. M. Peterson, Secretary, Board of Control, Winnipeg

## CONTRACTS AWARDED.

### Quebec.

**MONTREAL.**—It is reported here that Foley Brothers and Stewart have been awarded the contract to build the Grand Trunk Pacific 100 miles from Prince Rupert eastward. This firm is already constructing 200 miles west of Port Arthur, and another section close to Edmonton.

**MONTREAL.**—It was stated at the local office this morning that the Grand Trunk Pacific have decided to give the contract for the Port Rupert terminal section in British Columbia to Foley Bros., Larson and Stuart, of Winnipeg and St. Paul.

### Alberta.

**EDMONTON.**—James Fitzgerald, of Omaha, of the contracting firm of Tompkins & Fitzgerald, have secured a sub-contract for grading seven or eight miles of the right of way at a point some 68 miles west of Edmonton. The work will commence as soon as the frost is out of the ground in the spring.

## RAILWAYS—STEAM AND ELECTRIC.

### Ontario.

**TORONTO.**—Messrs. Isham Randolph, of Chicago, and W. T. Tye, of Montreal, consulting engineers, and Mr. Geo. A. Mountain, engineer for the Board of Railway Commissioners, have been looking over the revised plans of the Esplanade viaduct, which are being prepared by City Engineer Rust.

### Manitoba.

**WINNIPEG.**—Mr. J. D. McArthur, who has the contract in hand for building that part of the Grand Trunk Pacific



Railway between Winnipeg and Lake Superior Junction, a distance of 250 miles, states that he has had 7,000 men on the section during the whole of the winter. About sixty per cent. of the construction work had already been completed, and the grading will be about completed by the end of the present year. The cost of the work, however, will be much greater than originally anticipated. There will be no rebuilding of the Grand Trunk Pacific as it is now being constructed for years to come. There are a good many heavy bridges on the contract, and all of these are being built of steel and concrete, nothing being spared to make the road a superior one in every particular.

### NEW BUILDINGS.

#### Quebec.

**MONTREAL.**—The officers of the American Can Company have decided to recommend to their company the erection of a can factory in Montreal, to cost from \$200,000 to \$250,000, and to fully equip the same with modern tools and appliances for the manufacture of cans. In all probability the work on the building will be started as soon as a suitable location can be found that affords the proper railroad shipping facilities.

#### Saskatchewan.

**MOOSE JAW.**—At a representative meeting of ratepayers held here recently, it was unanimously decided to build a Collegiate Institute at a cost of \$100,000.

**MOOSE JAW.**—Coattman and Cloakley, architects, of Regina, are preparing plans for a large apartment building to be erected here during the coming season at a cost of over \$120,000.

#### British Columbia.

**VANCOUVER.**—The Moresby Island Lumber Company, an American corporation, will shortly begin construction work on a proposed \$350,000 saw mill to be erected on Cumshaw Inlet.

### MISCELLANEOUS.

#### Ontario.

**WELLAND.**—The first serious cave-in on the Welland Canal in the past ten years took place recently, at a point three miles south of Welland, when the east bank for a distance of 350 feet, slid into the water. Though no measurements have been taken, marine men say they believe a sufficient channel has been left for the passage of a boat, so that the opening of navigation on the canal is not likely to be retarded.

**OTTAWA.**—Tenders for the construction of 365 miles of the National Transcontinental Railway, covering six sections between Moncton and Lake Nipegon, were opened by the Commissioners during the past week. Nineteen tenders were received, contractors showing greater eagerness this year to undertake construction work than last year, when labor was scarce and wages higher. It is understood that figures quoted this spring by contractors are a little lower than last year. The names of the successful tenderers will not be known for some weeks, pending the report of the Commissioners' engineers as to figures quoted on each class of work. The Grand Trunk Pacific, as usual, tendered for each contract, in accordance with the policy of the company to make the construction of the road as cheap as possible.

**PORT ARTHUR.**—Mr. Milligan, superintendent for Hogan & Company, who have the contract for the building of the addition to the breakwater, states that he expects active work on the breakwater will commence about the latter part of April, just as soon as navigation opened. 5,000,000 feet of timber will be used in the cribs. His company endeavored to procure this material in Canada, but it was impossible to get it in the time required. The contracts were therefore let to Michigan dealers, and it was supplied last fall, and is now all in storage on the breakwater.

#### Manitoba.

**WINNIPEG.**—According to the statement of local improvements set down for construction this year there is to be

between \$500,000 and \$600,000 spent by the city on asphalt improvements, over \$32,000 on block pavements, and between \$400,000 and \$500,000 on plank and granolithic walks, sewers, grading, macadam pavements and water mains.

#### British Columbia.

**VANCOUVER.**—The Dominion Government is arranging to establish a wireless or cable telegraph service between Prince Rupert and Queen Charlotte Island, and between various larger islands.

**VANCOUVER.**—It is understood that the scheme for the improvement of False Creek, recommended to the Dominion Government by Engineer J. R. Roy, will cost \$1,500,000, and that the work is of a character which will take a number of years for its completion.

### PERSONAL.

**MR. SILAS B. WASS** has been transferred from Walkerton to Durham to fill the vacancy caused by the death of Mr. C. W. Doherty, engineer in charge of the Proton branch of the C.P.R.

**MR. WILLIAM GELL** has been appointed master mechanic in charge of motive power, cars and shops of the Grand Trunk Pacific Railway, with temporary headquarters at Winnipeg.

### DOMINION ESTIMATES.

Further supplementary estimates, totalling \$5,325,633, for the current fiscal year ending the 31st of this month, were brought down in the Commons by Hon. W. S. Fielding. Adding the above amount to the total of \$116,484,727 voted last session, and \$3,850,000 voted this session for seed grain in the West, the grand total of estimates for the current year is \$125,660,360.

Some of the larger items are as follows:—

Intercolonial Railway, increased accommodation at Halifax, \$220,000; rolling stock, \$80,000.

Public Works Department, improvements at St. Andrew's Rapids, Red River, \$62,000.

London post-office additions and improvements, \$6,600. Belleville Armory, \$6,600.

Toronto post-office, works of restoration to make good the damage done by fire, April 29th, 1906, etc., \$5,000.

Ottawa, public buildings, repairs, etc., \$164,100.

St. John harbor improvements, \$330,000.

Dredging at elevator wharf, Tiffin, Ont., \$76,500.

Dredging Owen Sound harbor, \$14,200.

### CANADIAN CROCKER-WHEELER COMPANY, LIMITED.

Another promising sign of returning confidence in the business situation is the organization of the Canadian Crocker-Wheeler Company, Limited, for the manufacture and sale in Canada of the well and favorably known Crocker-Wheeler apparatus.

The latter company manufactures practically all types of direct current and alternating current motors and generators, power transformers, motor generator sets, frequency changers, etc. Some of the best known lines being, direct current motors for special purposes, such as, machine tool and printing press drive, and steel mill work. For the latter, a line of motors has been specially developed, which has been found to fully meet the very severe conditions which exist in steel mills. Crocker-Wheeler alternating current generators up to 2,000-K.W. capacity have been in successful operation in Canada for some years.

The officers of the company are as follows:—Fritz E. Lovell, president; R. A. Stinson, vice-president; F. Jno. Bell, secretary-treasurer.

The head office is located in the Street Railway Chambers, Place d'Armes Hill, Montreal.



**ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.**

Copies of these orders may be secured from the Canadian Engineer for a small fee

4418—March 6—Approving Standard Passenger Tariff of the Ottawa Electric Railway Company, showing tolls to be charged within the limits of the city of Ottawa and between points therein and the boundary of the Experimental Farm; between the limits of the city of Ottawa and Britannia-on-the-Bay; and between the city limits and the Rockcliffe Rifle Range.

4419—March 12—Bell Telephone crossing over G.T.R. 1 1/8 miles east of St. Catharines Station, Ontario.

4420—March 6—Authorizing the Essex Terminal Railway Co. to operate and join with its track the track of the Lake Erie and Detroit River Railway Company at Walkerville, Ontario.

4421—March 6—Authorizing the Esquimalt and Nanaimo Railway Company to construct a branch line from its present terminus on the south side of Store Street, in the City of Victoria, B.C., to proposed additional terminal grounds of the applicant company on the north side of Store Street, viz., Block D, formerly owned and occupied by the Albion Iron Works.

4422—March 10—Authorizing the G.T.P. Railway Company to construct its railway across thirty-two highways from mile 0 to mile 42.029, Alberta.

4423—March 10—Authorizing the G.T.P. Railway Company to construct its railway across thirty-nine highways, from mile 42.029 to mile 77.619, Alberta.

4424—March 10—Authorizing the G.T.P. Railway Company to construct its railway across twenty-four highways, from mile 77.619 to mile 112.942, Alberta.

4425—March 10—Authorizing the G.T.P. Railway Company to cross with its track the track of the C.N.R. by means of an overhead bridge, in Section 14, Township 53, Range 24, west of the 4th meridian, District of Edmonton, Alberta.

4426—March 10—Approving deviation in the location of the Temiskaming branch of the C.P.R. in the town of Mattawa.

4427—March 10—Authorizing the G.T.R. to take for the purpose of moving from its present site and placing and maintaining thereon its passenger station at St. Hubert, P.Q., certain property forming part of Lot No. 32, in Concession Cote North East du Chemin de Chambly, in the Parish of St. Hubert, Quebec.

4428—Feb. 17—Authorizing the Brantford and Hamilton Electric Railway Company to erect, place and maintain its power transmission lines over the track of the G.T.R. at Cainsville, Ont.

4429—March 10—Authorizing the G.T.R. to connect its track of the C.N.R. Company's main line, in Lots 25, 26 and 27, Parish of St. Charles, District of Winnipeg and Province of Manitoba.

4430—March 12—Bell Telephone crossing G.T.R. at Jarvis Street, 1/2 mile north of Orillia station, Ontario.

4431—March 10—Authorizing the C.P.R. to use and operate bridge No. 96.2 on its Sherbrooke Section of its railway.

4432—March 11—Authorizing the C.P.R. Company to construct a bridge over the Little Key River and the James Bay Railway on its Toronto-Sudbury branch.

4433—March 11—Authorizing the Guelph and Goderich Railway Company to operate its trains on its line of track where the same crosses the track of the G.T.R. by means of an overhead crossing at the town of Goderich, Ont.

4434—March 11—Authorizing the Guelph and Goderich Railway Company to operate its trains on its line or track where the same crosses the track of the G.T.R. at the village of Blythe, Ont., by means of an overhead crossing.

4435—March 11—Authorizing the Guelph and Goderich Railway Company to operate its train on its line of track where the same crosses the track of the G.T.R. at the town of Milverton, by means of an overhead crossing.

4436—March 10—Approving location of the Esquimalt and Nanaimo Railway Company, north of Wellington, B.C., from mile 85.2 at Nanoose Bay, to mile 87.5.

**CANADIAN SOCIETY OF CIVIL ENGINEERS.**

(Continued from Page 204.)

P.Q.; F. P. Wilson, Maple Creek, Sask.; L. Amiot, Father Point, Que.; E. B. Archibald, Montreal; T. B. Ballantyne, Montreal; M. G. Bell, Toronto; V. H. G. Bell, Montreal; W. D. Black, Toronto; R. G. Boast, Richmond, Que.; A. L. O. Bolgen, Montreal; F. E. Bronson, Ottawa; E. C. Brown, Grenfell, Sask.; A. G. Bullock, Toronto; E. L. Caldwell, Bridgetown, N.S.; J. G. Campbell, Montreal; H. V. St. John Carman, Winnipeg, Man.; D. L. Carr, Montreal; T. Chiba, Montreal; A. W. G. Clark, Montreal; R. H. Cooper, Springhill, N.S.; R. Cox, Montreal; F. J. Dawson, Truro, N.S.; E. J. Dorree, Fort William, Ont.; J. N. Finlayson, Montreal; J. J. Fortin, Levis, P.Q.; F. W. Foster, Montreal; E. C. Girouard, St. Augustin, P.Q.; K. H. Gordon, Georgetown, P.E.I.; J. R. Graham, Montreal; R. E. W. Hagarty, Toronto; W. G. Hanson, Westmount; E. Harrison, Toronto; C. L. Hays, Bowmanville, Ont.; G. H. Herriot, Souris, Man.; P. McP. Higgins, Montreal; E. Holgate, Montreal; A. Holland, Montreal; A. Hutchison, Ottawa; H. M. Hyland, Toronto; G. J. Jackson, Simcoe, Ont.; H. H. James, Toronto; G. A. Jenkins, Kingston, Ont.; A. U. Jones, Montreal; G. C. Keith, Montreal; W. R. Key, Toronto; G. Kribs, Montreal; J. K. Laflamme, St. Paschal, Que.; A. Lighthall, Montreal; W. M. B. Macdonald, Montreal; W. D. Maclean, Montreal; H. M. Macpherson, Montreal; R. C. Marcus, Montreal; A. A. McCoubrey, Winnipeg; T. A. McGinnes, Belleville, Ont.; F. A. McGiverin, Hamilton, Ont.; W. L. McIntosh, Vermilion Bay, Ont.; H. B. Montizambert, Victoria Harbor, Ont.; H. V. Mooney, Montreal; R. Morrissette, Three Rivers, Que.; J. Paris, La Tuque, Que.; P. A. Picard, Indian Lorette, Que.; G. McL. Pitts, Montreal; C. H. Von Pozer, Montreal; C. W. B. Richardson, Toronto; C. M. Ross, Ottawa; H. T. Rowe, Durham, Ont.; J. B. Saint, Vancouver, B.C.; H. C. Saunders, Kingston, Ont.; O. H. Scott, Montreal; C. E. Seuleje, Montreal; W. W. Seymour, Montreal; L. J. Slattery, Hervey Junction; J. A. Smith, Sorel, Que.; S. M. Smith, Montreal; J. Strachan, Jr., La Tuque, Que.; H. F. Strangways, Montreal; W. G. Sweezey, Quebec; F. C. Taylor, Headingley, Man.; E. W. Thomas, Montreal; J. I. Vallee, Quebec, H. Vohl, Hervey Junction, Que.; G. Wase, Edmonton, Alta.; I. F. Willsie, Toronto; R. H. Winslow, Montreal.

**MARKET CONDITIONS.**

Montreal, March 19th, 1908.

During the past week there has been little or no change in foreign or domestic pig iron markets. Owing to the advance of spring, industries all over the country are showing a disposition towards greater activity, and, as a consequence, producers of pig iron are experiencing a somewhat improved demand. However, it does not follow that they are feeling much more hopeful, as an increase in demand is only to be looked for at this time of year, and without it trade would be in a very bad way. The prospect this season is not nearly so cheerful as it has been, at the same time for some years past, but all are hoping for better results than are indicated.

During the past week, trade in all lines of iron and steel has been marking time, the feeling in many lines being, however, just a little more hopeful than of late.

**Antimony.**—Prices continue steady, at 10 1/2 to 11c. per pound.

**Bar Iron and Steel.**—The market is steady. Bar iron, \$2.00 per one hundred pounds; best refined horseshoe iron, \$2.25, and forged iron, \$2.15; mild steel, \$2.05; sleigh shoe steel, \$2.05 for 1 x 3/8-base; tire steel, \$2.05 for 1 x 3/8-base; toe calk steel, \$2.50; machine steel, iron finish, \$2.15.

**Boiler Tubes.**—The market holds steady, demand being fair. Prices are as follows: Two-inch tubes, 8 to 8 1/4 c.; 2 1/2-inch, 11c.; 3-inch, 12 to 12 1/4 c.; 3 1/2-inch, 15 to 15 1/4 c.; 4-inch, 19 1/4 to 19 1/2 c.

**Building Paper.**—Tar paper, 7, 10, or 16 ounce, \$2 per 100 pounds; felt paper, \$2.75 per 100 pounds; tar sheathing, No. 1, 60c. per roll of 400 square feet No. 2, 40c.; dry sheathing, No. 1, 50c. per roll of 400 square feet, No. 2, 32c.



**Cement—Canadian and American.**—Canadian cement is generally quoted at \$1.70 to \$1.75 per barrel, in cotton bags, and \$1.95 and \$2.05 in wood, weights in both cases 350 pounds. There are four bags of 87½ pounds each, net, to a barrel, and 10 cents must be added to the above prices for each bag. Bags in good condition are purchased at 10 cents each. Where paper bags are wanted instead of cotton, the charge is 2½ cents for each, or 10 cents per barrel weight. American cement is steady at \$1.10 per 350 pounds, basis Glens Falls or Lehigh mills, cotton or paper bags. When the cotton bags are returned in good condition, only 7½ cents is allowed for them. American cement sold at \$2 on track.

**Cement—English and European.**—English cement is unchanged at \$1.75 to \$1.85 per barrel in jute sacks of 82½ pounds each (including price of sacks) and \$1.95 to \$2.05 in wood, per 350 pounds, gross. Belgian cement is quoted at \$1.70 to \$1.80 per barrel in bags, and \$2.05 to \$2.10 per barrel, in wood.

**Copper.**—The market for copper is unchanged. Prices are 15½ to 16c. per pound.

**Iron.**—Prices for delivery after the opening of St. Lawrence navigation are approximately as follows: No. 1 Summerlee, on cars, Montreal, \$21 to \$21.50 per ton; No. 2 selected Summerlee, \$20.50 to \$21; No. 3, \$20 to \$21; No. 1 Cleveland, \$18.50, and No. 3 Clarence, \$18.

**Lead.**—Quotations are still \$4 to \$4.10 per 100 pounds.

**Nails.**—Demand for nails is steady, prices being \$2.30 per keg for cut, and \$2.25 for wire, base prices.

**Pipe—Cast Iron.**—Trade dull and prices steady at \$36 for 8-inch pipe and larger; \$37 for 6-inch pipe, \$38 for 5-inch, and \$39 for 4-inch at the foundry. Gas pipe is quoted at about \$1 more than the above.

**Pipe—Wrought.**—The market is firm but dull. Quotations and discounts for small lots, screwed and coupled, are as follows: ¼-inch to ¾-inch, \$5.50, with 54 per cent. off for black and 38 per cent. off for galvanized. The discount on the following is 66 per cent. off for black and 56 per cent. off for galvanized: ½-inch, \$8.50; 1-inch, \$16.50; 1¼-inch, \$22.50; 1½-inch, \$27; 2-inch, \$36; and 3-inch, \$75.50; 3½-inch, \$95; 4-inch, \$108.

**Spikes.**—Railway spikes are not in very good demand. \$2.60 per 100 pounds, base of 5½ x 9-16 Ship spikes are steady at \$3.15 per 100 pounds, base of 5½ x 10 inch and 5½ x 12 inch.

**Steel Shafting.**—At the present time prices are steady at the list, less 25 per cent. Demand is very dull and lower figures would hardly be refused.

**Steel Plates.**—Demand is quite dull and a firm bid at lower figures than quotations would be considered. Quotations are: \$2.75 for 3-16, and \$2.50 for ¼ and thicker, in small lots.

**Tar and Pitch.**—Coal tar, \$4 per barrel of 40 gallons, weighing 575 to 600 pounds; coal tar pitch, No. 1, 75c. per 100 pounds, No. 2, 65c. per 100 pounds; pine tar, \$4.35 to \$4.50 per barrel of about 280 pounds; pine pitch, \$4.25 per barrel of 180 to 200 pounds.

**Tin.**—The market holds steady, being now quoted at 33 to 33½c. per pound.

**Tool Steel.**—Demand is light, but the market is firm. Base prices are as follows: Jessop's best unannealed, 14½c. per pound, annealed being 15½c.; second grade, 8½c., and high-speed, "Ark," 60c., and "Novo," 65c.; "Conqueror," 55 to 60c.; Sanderson Bros. and Newbould's "Sabon," high-speed, 60c.; extra cast tool steel, 14c., and "Colorado" cast tool steel, 8c., base prices. Sanderson's "Rex A" is quoted at 75c. and upward; Self-Hardening, 45c.; Extra, 15c.; Superior, 12c.; and Crucible, 8c.; "Edgar Allan's Air-Hardening," 55 to 65c. per pound.

**Zinc.**—The market is unchanged, at 5¼ to 5½c. per pound.

\* \* \* \*

Toronto, March 19th, 1908.

A moderate amount of new business is reported in most building lines, with prices remaining firm. The volume of

metals moving is increasing somewhat, and the nearing of spring and milder weather have had a noted effect on many lines. The aggregate of business over last week is easily considerably in excess of that of the previous week.

The following are wholesale prices for Toronto, where not otherwise explained. Higher prices are quoted for broken quantities:—

**American Bessemer.**—Fourteen-gauge, \$2.45; 17, 18, and 20-gauge, \$2.60; 22 and 24-gauge, \$2.65; 26-gauge, \$2.80; 28-gauge, \$3.

**Antimony.**—Quiet, but inquiries are coming in more freely; we quote 11½ to 13c.

**Bar Iron.**—\$2.10 base, from stock to the wholesale dealer.

**Beams and Channels,** \$2.75 to \$3, according to size and quantity; angles, 1¼ by 3-16 and larger, \$2.65; tees, \$2.90 to \$3 per 100 pounds. Extras for smaller sizes.

**Boiler Heads.**—25c. per 100 pounds advance on boiler plate.

**Boiler Plates.**—¼-inch and heavier, \$2.50. Supply probably adequate and quotations still firm.

**Boiler Tubes.**—Lap-welded steel, 1¼-in., 10c.; 1½-in., 9c. per foot; 2-in., \$9.10; 2¼-in., \$10.85; 2½-in., \$12; 3-in., \$13.50; 3½-in., \$16.75; 4-in., \$21 per 100 ft.

**Building Paper.**—Plain, 32c. per roll; tarred, 40c. per roll.

**Bricks.**—Common structural \$10 per thousand, wholesale; small lots \$12 to \$13, and the demand improving. Red and buff pressed are worth \$18 at works.

**Cement.**—The price of Canadian manufactures of cement to the dealer in thousand barrel lots and up is \$2.15, in cotton bags, including cost of packages, on car, Toronto. The dealers' price to the contractor up to car-load lots without package price, are general at \$1.95 per barrel in cotton bags and \$2.10 in wood, weight in each case 350 pounds.

**Detonator Caps,** 75c. to \$1 per 100; case lots, 75c. per 100; broken quantities, \$1.

**Dynamite,** per pound, 21 to 25c., as to quantity.

**Felt Paper—Roofing Tarred.**—Market steady at \$2 per 100 pounds. The spring prospects good.

**Fire Bricks.**—English and Scotch, \$32.50 to \$35; American, \$25 to \$35 per 1,000. Demand is fair.

**Fuses—Electric Blasting.**—Double strength, per 100, 4 feet, \$4.50; 6 feet, \$5; 8 feet, \$5.50; 10 feet, \$6. Single strength, 4 feet, \$3.50; 6 feet, \$4; 8 feet, \$4.50; 10 feet, \$5. Bennett's double tape fuse, \$6 per 1,000 feet.

**Galvanized Sheets—Apollo Gauge.**—Sheets 6 or 8 feet long, 30 or 36 inches wide; 10-gauge, \$3.25; 12-14-gauge, \$3.35; 16, 18, 20, \$3.50; 22-24, \$3.70; 26, \$3.95; 28, \$4.40; 29 or 10¼, \$4.70 per 100 pounds. Stocks very low.

**Ingot Copper.**—Has been fluctuating abroad, and a good deal sold for forward delivery in the belief that prices are going up. Local price continues at 13¾ to 14½c.

**Lead.**—Holding its own at 4½c.

**Lumber.**—There is much firmness all over the list, especially in higher class pine. Dressing quotes at \$32 to \$35 per thousand for usual lengths, and stock sizes of boards; \$38 to \$40 for special lengths; common, as to grade, \$24 to \$28; culls, \$22. Norway pine and Southern steady; hemlock, \$19 to \$21.50, as to size. Spruce flooring, \$27, whole-

## SECOND-HAND FOR SALE

Hoisting Engines, double cylinders & drums, 6x8" & 7x10" with boilers  
Robinson Steam Shovel, 2½ yards capacity.  
Saddletank Locos, 36" and standard gauge.  
Concrete Mixers, Smith, Ransome, Champion, all sizes.  
Crushers, gyratory and jaw, various sizes, some portable.  
Switch Engine standard gauge.  
Pumps, Derricks, Engine Boilers, &c., &c.

PRICES ON APPLICATION.

NEW MACHINERY OF EVERY DESCRIPTION

**THE HARTLAND COMPANY**

332 Board of Trade Building, MONTREAL.