

**PAGES**

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# The Canadian Engineer

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No. 11

## The Canadian Engineer

ESTABLISHED 1893.

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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.

Advertising Manager.—A. E. Jennings.

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HEAD OFFICE: 62 Church Street, and Court Street, Toronto, Ont. Telephone, Main 7404 and 7405, branch exchange connecting all departments.

Montreal Office: B33, Board of Trade Building. T. C. Allum, Editorial Representative, Phone M. 1001.

Winnipeg Office: Room 315, Nanton Building. Phone 8142. G. W. Goodall, Business and Editorial Representative.

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TORONTO, CANADA, MARCH 18th, 1910.

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### ONTARIO'S TELEPHONE BILL.

During recent years Ontario has become a network of telephone lines. Not only has the Bell Telephone Company reached out with its trunk lines, but in almost every section of the Province it has been building local lines. In addition to this great development which has been carried on by the "Bell" there have been numerous independent companies organized, and almost every township has its own independent telephone system.

It is but natural to suppose that this condition of affairs would very shortly reach a crisis. Companies wishing to serve the same district and becoming rivals for business were cutting rates below cost. Rivalry grew into jealousy, until it became impossible for people only half a mile apart to get telephone connection.

A special committee of the Ontario Legislature has been inquiring into the matter, and they recommend that the Ontario Railway and Municipal Board shall have power to order connections between independent telephone companies, decide the rate to be paid for such connections, and to compel telephone companies to give service to those requiring it, and to fix the rate.

The Bell Telephone Company object to certain clauses of the Bill, claiming that they are "ultra vires." They claim that they are a Dominion company, and as such are not under the control of the Provincial Legislature.

There is no doubt but that the Dominion Railways' Commission, which has jurisdiction over the Bell Company and the Ontario Railway Board, will be able to effect a reasonable and just arrangement for the interchange of messages should the Bell Company persist in the stand they have taken.

The great service the telephone companies are doing for the Province is becoming recognized, and the telephone is not now looked upon as a luxury, but a necessity.

The confusion that arises from the handling of the telephone business by so many independent companies will result in either Government ownership or Government control, and it were foolish for any company to fight against such a movement.

### THE CANADIAN CEMENT SHOW.

On March 29th, 30th and 31st, 1910, the Canadian Cement Association will hold their second annual exhibition and convention in the city of London, Ont. During the period since its organization, a little over a year ago, this Association has done splendid work in informing the public on the suitability of concrete for various structures, and on keeping the cement users informed as to the best methods in design and the most modern practices in construction.

Their exhibition at London will be extensive and comprehensive, and the papers read at the Association

meetings will cover a wide range of subjects, and will be given by men of experience in the United States and in Canada.

Construction work in all branches will be very active during 1910, and those interested in the manufacture and sale of cement and in the various systems of reinforcements, as well as in the planning and designing of works where this material may be used, will find it to their advantage not only to support this exhibition, but to attend it.

### SUB-CONTRACTS ON THE RAILWAY.

The number of large railroad contracts that are now being closed raises again the question of the relation between the engineer, the sub-contractor and the station men.

Railway companies are in the habit of letting large stretches of their road to one large company, preferring to deal with one firm instead of twenty. The main contractor sublets in from two to ten-mile sections to sub-contractors, of course, making the best bargain they can with him, and usually managing to get him to take the work at a price from ten to twenty per cent. less than they received from the railway. The sub-contractor frequently sublets to station men at prices varying from fifteen to twenty per cent. less than they received from the contractor. The resident engineer then has to require from the men who do the work, at forty per cent. less than contract price, that they live up to the specifications.

It is all very well to say that the engineer in passing work must not take into consideration the conditions under which the man gets the work. Nor will it do to say that the chief engineer knows the conditions under which the work was let. The chief engineer will require from every resident engineer that he get a dollar's worth of work for every dollar spent by his company.

It is about time that some new arrangement was entered into between the railways and the contractors who do not do the work themselves. A dividing of the contracts into sections would make it possible for the men who took the contract to supervise their own work instead of making a few contractors rich at the expense of sub-contractors and station men. The railways would get better work done at a lower price. The men who do the work will get the money, and the resident engineer will have little difficulty in securing fulfilment of his specifications.

### POWER TRANSMISSION.

It is a much-discussed question, the Transmission of Power. As to whether electrical or mechanical transmission is the cheaper will depend on the conditions under which the respective methods of transmission may be called upon to operate.

It is not probable that mechanical transmission will be ever entirely superseded by electrical methods, as there are conditions and circumstances under which mechanical transmission is much more efficient.

There are conditions under which electrical transmission would be very unsuited; for example, on machine driven at constant speed in one direction. A similar machine on which varying speeds and both directions of motion were required the advocates of electrical transmission will doubtless be able to show their system to great advantage.

Another condition under which electrical transmission may be very advantageously employed is in mills and factories where several line shafts driving machines by belts. In such cases the power loss in transmission is great.

The installation of electric transmission is very elastic, and makes it possible to enlarge and extend the shops and machinery with but little trouble. Small machinery may be worked by itself independent of other parts of the plant, and the power required for each machine be very conveniently measured; and in addition, the location of the power plant is not so important as when a mechanical drive is used.

For mechanical transmission extensions to the system are difficult to provide, and when the transmission has to be through long lengths of shafting the power is wasted.

Mechanical transmission is usually much less expensive than electrical, both as regards initial outlay and running cost, but the measurement of power is more easily effected with electrical transmission, and where even turning is required the electrical system will be the more suitable, although equal results may be obtained from either systems in respect to even turning and output.

### THE PLANNING OF A TOWN.

Recently we had an editorial on this question, in which we suggested the necessity of careful planning and perfecting of schemes before town sites are placed on the market or addition to present towns was made.

Since then a Bill has been introduced into the Ontario Legislature by the Honorable the Minister of Crown Lands, which provides that one-quarter of the space included in newly laid out town sites shall become the property of the Province of Ontario. In the discussion on this Bill, which on the face of it appeared to apply only to New Ontario, it became evident that from the wording of the context it might be made to apply to the whole Province.

It goes without saying that the Province must have funds to carry on government; it is also known that the more indirect the tax the less trouble there is in defending the tax rate, but we think it very unfortunate that the Government should place a premium upon haphazard work by taxing to the limit carefully prepared, well-planned and competently designed schemes.

This is what such a tax must mean.

If the land is sold lot by lot in some hit-and-miss manner, without any definite scheme as to future development or the segregation of the manufacturing, business and residential districts, it will not be a town site. But when a man secures a piece of property, lays it out in streets, boulevards and crescents; plans for pavements, parks and drives and perfects his plan, the moment he registers his plan and puts it upon the market, his enterprise is taxed at the rate of twenty-five per cent.

It is unfortunate that in an endeavor to retain for the Province an interest in the unearned increment value in new town sites the Government should hit upon a plan which is such a direct blow on good work. The desire to obtain revenue should be subordinate to the possibility of future beauty and convenience of growing towns. Most of the defects in the planning of Canadian Towns and Cities is the result of growth without vision; of expansion without direction; and if this measure proposed

by the Government becomes law, we will have a continuation of badly laid out streets, without provision for parks and playgrounds and public squares, and it is quite likely that we will continue to place our public buildings in the most unsuitable surroundings.

It is to be hoped the Government will reconsider their measure and find some better plan of retaining their interest and securing revenue than by so heavily taxing those who would design for the future as well as build for the present.

**CONTRACTORS' DIRECTORY.**

In this issue of The Canadian Engineer there will be found on page 12 the commencement of a list of Canadian contractors and engineering-contractors.

Such a list in an engineering journal is a new departure, but it is opened with the idea of increased service to our readers and to our advertisers.

The work of the engineer and the contractor lie close together; they have so many matters of common interest that such a list appears to come naturally to a journal reaching the civil engineers.

We confidently expect that this list will be used by municipal officers and engineers wishing to get in touch with contractors who are ready to take up new work.

The contractors, in addition to this service, will find that supply houses with new ideas and new propositions to place before possible purchasers will through these columns get in touch with them.

We are under the impression that this new service will be appreciated by a large number of contractors who have been doing large work for years, but have not as yet had an opportunity of keeping their names before the public, so that when they come into new districts or undertake new work they will not be unknown, either among those who have charge of work or those who

**AN EDITORIAL ANNOUNCEMENT.**

Commencing next week, Mr. L. W. Gill, M.Sc., Kingston, Ont., will contribute a series of articles dealing with Elementary Electrical Engineering. Although some space will be devoted to theory, many very practical problems will be suggested and solved.

**EDITORIAL NOTES.**

The first issue of each month contains an insert usually of special interest and particular value to engineers. We will be pleased to furnish the inserts in any quantity to those desiring them.

\* \* \* \*

The Government of Nova Scotia has introduced into the Legislature an "Eight-hour day bill." All stores, factories and street railway companies are forbidden to ask their employees to work more than six days a week or ten hours a day. There is a penalty attached, and the maximum fine is \$50 for each offence or three months imprisonment. It is unfortunate that it appears necessary to so compel municipalities to be reasonable with their men.

\* \* \* \*

During the first few days the Information Department established by The Canadian Engineer at its Toronto office has been instrumental in placing a number of engineers in touch with men who required their services.

Spring has already touched many Canadian points, and the demand for increased assistance is becoming apparent. We have on file particulars of the experience of some eighty technically-trained men desirous of improving their professional standing, but occasionally we are asked to fill positions for which we have not suitable clients. We want our readers to take full advantage of our services. Through the lack of your address and details of your record we were reluctantly compelled to let a desirable position "go begging." Tell our Information Department what kind of work you are looking for. "Send for a blank."

**PRECIPITATION FOR FEBRUARY.**

Over the eastern portions of the Dominion exclusive of northern and north-western Ontario, the precipitation was in excess of the normal amount, as it also was in Vancouver Island; but from about Lake Huron westward to the Pacific Coast, there was a very general deficiency. In the Maritime Provinces the greater part occurred in the form of rain, and in Ontario and Quebec, while there were several days of rain, the major part of the moisture fell in numerous light snowfalls. In the Western Provinces there was no rain and the snow was very light, except in Eastern Manitoba, where there were several considerable falls. Heavy snowstorms occurred in British Columbia and in Vancouver Island the total precipitation was in excess of the average.

**Depth of Snow.**

At the close of the month the Dominion was snow-covered, with the exception of parts of Southern Alberta and some of the lower levels of British Columbia. The greatest depth was in Ontario, north of the great lakes, and in Northern Quebec, where it was from twenty to forty inches. From five to ten inches near Lake Ontario was the least depth in Ontario. In the Maritime Provinces, twenty inches in Northern New Brunswick diminished to less than ten inches near the Bay of Fundy, and in Nova Scotia and Prince Edward Island. In the northern portions of Manitoba, Saskatchewan and Alberta, the covering was from ten to twenty inches, while southward near the boundary the depth averaged about eight inches east of Moose Jaw, and but a very light covering further west. In British Columbia, after many heavy storms, the snow is deep at the higher levels, but near the coast and at the low levels there is little, if any.

The table shows for fifteen stations included in the report of the Meteorological Office, Toronto, the total precipitation of these stations for February.

Ten inches of snow is calculated as being the equivalent of one inch of rain:—

Station	Depth in inches	Departure from the average of twenty years
Calgary, Alta. ....	0.9	+ 0.35
Edmonton, Alta. ....	0.1	— 0.64
Swift Current, Sask. ....	0.6	— 0.05
Winnipeg, Man. ....	1.6	+ 0.91
Port Stanley, Ont. ....	3.4	+ 0.42
Toronto, Ont. ....	3.2	+ 0.88
Parry Sound, Ont. ....	3.5	+ 0.27
Ottawa, Ont. ....	2.3	— 0.20
Kingston, Ont. ....	2.7	+ 0.61
Montreal, Que. ....	4.6	+ 1.37
Quebec, Que. ....	3.9	+ 0.84
Chatham, N.B. ....	2.8	+ 0.01
Halifax, N.S. ....	7.0	+ 2.48
Victoria, B.C. ....	4.7	+ 1.13
Kamloops, B.C. ....	0.9	+ 0.08

**REPORT ON TEMPORARY TRESTLING.\***

**Francis Dawson.**

Temporary trestles as applied to railway work may be divided into two general classes: (1) Those built in the construction of the line and (2) those used for bridging washouts and burnouts.

The first class is the most important and varies in size and cost from a couple of logs run out as stringers over a framework of a cap and two or three short struts resting upon the ground and filled in from trolleys to large and well-built trestles of several bents which are filled in before the structure decays by train haul. The highest and largest temporary trestle of which I could find any record was constructed on the North Alabama Railroad. It was 116 ft. high and 690 feet long, with 6 storeys—five over 80 feet high and seventeen over 60 feet high. The main thing in structures of this kind is cheapness consistent with getting the work done expediently.

Contractors have many and various ways of making fills. One of the commonest is to lay the trolley track upon two log stringers supported at the end by the embankment and at the other by a framed bent. The stringers are afterwards taken up as it is advisable to have as little material that will decay in the fills as possible. For small fills of six to ten ft. the above method answers very satisfactorily but for higher ones more secure bents must be used. These are generally composed of a bottom sill securely founded, four posts—the two centre ones being straight and the outer ones having a batter varying with the general conditions of  $\frac{1}{6}$  to  $\frac{1}{12}$  or even straight. The sill is notched slightly to receive the posts, which are also securely fastened with dowels and drift bolts. The cap is usually about ten inches in diameter with the posts notched into it  $1\frac{1}{2}$  to 2 inches and drift bolted with  $\frac{1}{2}$  to  $\frac{3}{4}$ -inch drift bolts.

The writer has seen several of these trestles in actual use, and as the general outlines and method of construction are mainly the same, one of the larger will be described more in detail.

The trestle is situated in Residency, N.T.C. Railway, near Grand Falls, N.B. It was constructed by M. G. Henniger, at his own expense, solely for the purpose of handling the material which was excavated in a neighbouring cut. The cut, an exceptionally large one, was being taken out by a steam shovel and the problem was to find a method of making an embankment that would permit of sufficient cars being kept at the shovel to keep it working all the time. The fill averaged 30'-40" in depth and a single storey trestle was built over it, as is shown in the photographs. A small 12-ton Dinkey ran side-dump cars on a 3-foot guage track over the trestle. The chief difficulty encountered was to prevent large stones from displacing the batter posts.

Each bent was composed of (1) a bottom sill of hardwood  $1\frac{1}{2}$  to 2 feet in diameter; (2) three posts, the centre one being vertical and the two outer having a batter of one to six-inches. The posts were long, straight timbers 30 to 40 feet in length, depending upon the location of the bent and of various sizes, none smaller than 5-inch diameter at the small end being used. (3) The cap was nine feet in length and 12 to 15 inches in diameter. (4) Three longitudinal stringers notched over the caps and drift bolted to them with  $\frac{1}{2}$ -inch bolts. Sway and longitudinal braces composed of straight timbers three to six inches in diameter and securely fastened to the posts and sills by  $\frac{1}{2}$ -inch bolts.

**Method of Construction.**

A peg was driven to mark the centre of each bent, and small stakes were set at each side to mark the location of the

batter posts. A level surface was secured on which to place the lower sill. No effort was taken to make the bed level all the way across. Instead mud sills were placed longitudinally on the lower side, and earth dug out from underneath them until the sill was level. This did away with adzing or shimming the sill, which is always an objectionable feature. Where the ground was soft more bearing was secured by using more and longer mud sills.

The foundation being completed, the posts and cap for a bent were hauled by horses to the site just ahead of the foundation. The sill was then rolled over and the posts were toenailed and drift-balted into position. The cap was next drift-bolted to the posts by  $\frac{3}{4}$ -in. drift bolts. When the bent was all assembled the cross-braces were placed and securely fastened by  $\frac{1}{2}$ -inch bolts. For heights over twenty feet two sets of braces were used.

To raise the bent one 2-shive block was fastened around the centre of the cap and the centre post and another block anchored to the preceding bent which had already been erected and securely braced. One and a half-inch rope was used and one horse hauled the bent up easily. To prevent the bent from going too far a 1-inch snubbing-rope was anchored at any convenient point and two temporary struts from the sill of the preceding bent to the sill of the bent which was being raised prevented the bottom from slipping. When erected the bent was pinched over so as to be centred on the alignment stake then plumbed and tied to the preceding bent with sash braces and waling braces.

**Costs.**

From accurate cost-keeping during the construction of the greater part of this trestle, namely, 900 feet out of a total length of 1,150 feet I found the cost to be distributed as follows for one bent:—

Hauling logs, including felling and trimming—	
Labour, 30 hours at 20c. ....	\$ 6.00
Foreman, 5 hours at 30c. ....	1.50
Team, 5 hours at 40c. ....	2.00
	<hr/>
	\$ 9.50
Making and Raising Bent—	
Labor, 36 hours at 20c. ....	7.20
Foreman, 6 hours at 30c. ....	1.80
Team, 5 hours at 40c. ....	2.00
	<hr/>
	\$11.50
Cost of timber (standing) approximate..	0.50
Cost of iron for bolts, etc., 30 lbs. at 4c.	1.20
Depreciation and interest on tools.....	0.05
	<hr/>
Total .....	\$22.55
Panel length 16 ft. therefore cost per foot	
2225	
<hr/>	
16	1.39

The second class of temporary trestles, namely, those used in bridging burnouts and washouts, while not so numerous as those used in construction are nevertheless very important. Here the first essential is speed. Traffic must not be delayed any longer than is absolutely necessary. The actual costs do not enter materially into the question as the object is to get trains across as soon as possible, allowing the more permanent work to be put in later.

When a washout or burnout occurs the first information necessary is the definite location of the break in the track. The next question is what kind of structures are destroyed, length, depth of opening, characteristics of stream and

(Continued on page 251).

\* Read before the Nova Scotia Society of Engineers.

# THE Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND  
WATER PURIFICATION

## TYPHOID IS SPREADING.

Seventy Cases Reported in First Twelve Days of March.

(The Toronto Daily Papers.)

Seventy cases of typhoid fever were reported to the Toronto Medical Health Officer in the first twelve days of March. There were twenty-two cases in the whole of March last year.

The colonies of bacteria in the water drawn from the tap in the City Hall on March 7th had increased to 5,540 per cubic centimetre, and there was coli communi in the water on that date.

## TORONTO'S PURE WATER SUPPLY PROBLEM.

The city of Toronto is installing a "slow sand filtration" plant, in order to purify Lake Ontario water before it is delivered to the consumer.

The first cost of installation approximates \$700,000.

The annual cost of operating expenses will approximate \$20,000. This being the cost for operating such plants on the American continent.

The operating expenses capitalized at 5 per cent., added to the cost of installation, makes a total cost to the city of \$1,100,000.

Is Toronto justified in investing this sum in an enterprise for purifying Lake Ontario water?

The Toronto newspapers, especially the "Telegram" and the "Globe," have raised this issue: "Is it essential to filter Lake Ontario water?"

Criticism has engendered an element of doubt in the public mind. Citizens are concluding that the decision to filter has been arrived at without considering the alternative: "Is it possible to obtain water which does not require to be filtered?"

What is the alternative suggested by the press?

Simply: "Carry out the intake pipe further into the lake."

It is suggested that a point can be found where wave action and currents cease to trouble, and where sewage entereth not.

Is the suggestion feasible, and, therefore, an alternative to filtration?

Let us consider this question for surely it must be worth considering, as no idiot is going to filter Toronto's water supply if such can be avoided. On the other hand, it looks like trying a man after he is hung, for inasmuch as "filtration" has been accepted, Lake Ontario as a possible source of raw pure water has been condemned.

What are the alleged iniquities connected with Toronto's water supply which have caused its condemnation?

They would appear to be:—

(a) Turbidity.

(b) Sewage pollution.

(a) "Turbidity" in the water shows itself as "muddiness." When the winds from the east wax strong the

waves get angry and irritate the bottom of the lake. When the lake is calm and quiescent, all "mud," "sand," silt and other stuff heavier than water rest peacefully at the bottom; otherwise, we get water in the form of a grit mixture. The shallower the water, the stronger the mixture.

This mixture will not produce typhoid unless the typhoid germ is in it.

If the grit is composed of fine sand particles of a quartz nature, and we get a sufficiency, it will irritate the intestines, causing enteric conditions, and will predispose a person to typhoid infection. Fine, ground glass has been used as a poison, as it causes lesions in the intestinal linings.

We would, therefore, rather have water without grit particles.

(b) "Sewage pollution" constitutes the chief iniquity. Sewage is proven to be in Toronto's water supply (at times) by the presence of a particular organism (B. coli) of an intestinal origin. Also, the water shows at times a greater number of bacteria than are known as the normal quantity in pure Ontario Lake water.

The normal number of bacteria varies considerably in different acknowledged pure waters. A pure water supply may give 50 to 500 per c.c.

Ontario Lake water in the vicinity of Toronto, when uncontaminated by the waste discharges from the city and neighborhood, is very pure, producing normal counts of from 8 to 10 bacteria per c.c.

Note.—This data is based upon over one hundred samples of water taken by the Provincial Board of Health at points anywhere from 500 feet to five miles south of Toronto Island.

The trouble is: It is possible to obtain this pure water one day, and impossible the next:

Winds and currents may at any time bring this pure Ontario Lake water within the zone of Toronto's contaminating influences.

Lake Ontario water, when uncontaminated by Toronto's waste products is an absolutely ideal pure drinking water.

Samples taken recently show:—

(a) At the intake pipe 1,200 bacteria per c.c.

(b) At a point 500 feet beyond the intake pipe, depth of water 100 feet (sample taken by the "Telegram"), 448 bacteria per c.c.

Sample (a) means that the water at the intake pipe contained 99.16 per cent. more bacteria than pure Ontario Lake water.

Sample (b) means that the water 500 feet beyond the present intake at a greater depth contained 97.77 per cent. more bacteria than pure Ontario Lake water.

**How far is it necessary to continue the intake pipe into the lake in order to ensure at all times pure Ontario Lake water?**

Under present and future conditions we cannot see how the "Telegram" or anyone else can answer this important question.

What are the present conditions? The whole of the sewage from Toronto (over 30,000,000 gallons per day) enters Lake Ontario and Toronto Bay anyhow and anywhere in its raw, crude state.

What are the proposed future conditions? The whole of the sewage from Toronto will be collected at one location,  $3\frac{1}{2}$  miles east of the intake pipe. From 60 to 70 per cent. of the grosser solids will be there removed from the sewage and dumped into Ashbridge's Bay. The whole of the crude liquid sewage, with from 40 to 30 per cent. of the finer solids, will be sprayed into Lake Ontario at a point where there is acknowledged, at times, to be a direct current towards the intake pipe. This sewage will hand out millions of bacteria per c.c. to pure Ontario Lake water.

Alfred W. G. Wilson (geological lecturer, McGill University), states in "Currents and Shore Processes in Lake Ontario as follows:—

"The local longshore currents west bound off Scarboro' sometimes attain a velocity of nearly four miles per hour during a period of easterly winds. This means that any waste which would float or mix with the waters of the lake would reach the western end of the Island within two and a half hours from the time when it was discharged into the lake at any point near Victoria Park."

The Island itself has been built up, and is still being added to, by this current. **If sand will carry from Scarboro' to the Island, why not bacteria?**

If we admit the present and future possibility of sewage contamination of pure Lake Ontario water, **is the lengthening of the intake pipe an alternative to filtration?**

The answer must be: "Any reasonable prolongation of the intake pipe into deeper water will not insure the delivery of pure water, at all times, unless it be accompanied by measures to remove all chance of sewage contamination, re-establishing the pristine characteristics of pure Ontario Lake water in the neighborhood of Toronto.

Can the City Council, any newspaper, any body of men, or any hygiene expert, "take a chance" when it is a question of civic policy affecting life and death?

When the whole of Toronto's crude liquid sewage is concentrated and poured into this western current, who is going to say just where the intake pipe should stop and at what depth?

**The proposed extension of the intake pipe, under present conditions, is no alternative to sand filtration or any other approved method of water purification.**

If it is possible to extend the intake pipe, then certainly extend it. Better and less turbid water will be

obtained further out in the lake, giving less work to the filters and providing greater efficiency in results.

There exist two solutions to Toronto's pure water supply problem, and two only. They are:—

(a) **Admit that it is impossible to keep sewage contamination out of Lake Ontario in the neighborhood of Toronto, then proceed to filter out the sewage poured into it, and so reduce the typhoid chance by from 98 to 99 per cent.**

(b) **Admit that it is possible to keep sewage contamination out of Lake Ontario (by "sterilization of sewage" methods or any other method), and then admit that the necessity has ceased to filter out something which no longer exists.**

As a corollary to either of the above propositions there may be added: **Extend the intake pipe to beyond the zone of turbidity if possible.**

### STERILIZATION OF SEWAGE EFFLUENTS AND TORONTO'S PURE WATER SUPPLY PROBLEM.

In last week's issue The Canadian Engineer dealt with the question of sterilization of sewage effluents in a review of the valuable experimental work recently carried out in the United States by E. Bernard Phelps.

It was shown that in accordance with the results obtained by Phelps it is possible to disinfect crude, settled sewage to the extent of a bacterial removal of from 98 to 99 per cent. by the addition of from five to ten parts per million of available chlorine at a cost of from \$1.50 to \$3 per million gallons of sewage.

**For a city of the size of Toronto the capitalized cost of installing, operating and maintaining a sewage disinfecting plant would not exceed \$500,000.**

**The capitalized cost for removing the sewage from Lake Ontario water by sand filtration is \$1,100,000.**

It will cost more than twice the amount of money to remove the sewage bacteria from Lake Ontario water as it will cost to keep the sewage bacteria out of Lake Ontario water.

The delivery of crude liquid sewage direct into Lake Ontario will affect the people of Toronto in a hundred and one other ways apart from the direct water supply.

Toronto is spending \$2,500,000 in order to concentrate the whole of its liquid sewage, plus from 40 to 30 per cent. of the finer solids in the western lake current in order that Toronto Bay may be free from sewage, and in order that the sewage may have a free, unimpeded run to the water supply intake.

Toronto is spending \$1,100,000 in order to remove from the intake pipe water the sewage which they are providing by the above cost of \$2,500,000.

When Toronto discovers that the old maxim, "Prevention is better than cure," is true of Toronto as of elsewhere, then, and then only, will Toronto's pure water supply be solved to the satisfaction of everyone concerned.

### MAYOR GEARY AND TORONTO'S PURE WATER SUPPLY PROBLEM.

The greatest task which Mayor Geary has before him during his term of office is to formulate some comprehensive policy which has in view: **The repurification of Lake Ontario water, and the solution for ever of Toronto's pure water supply problem.**

Toronto's water is impure, because Toronto's sewage makes it impure.

When Toronto's sewage is rendered pure by any of the well-known methods for the purification of sewage and sterilization of disease germs in the sewage, then Toronto's pure water supply problem will be for ever settled.

As long as Lake Ontario in the neighborhood of Toronto is used for purposes of purification of sewage by "oxidation," "sedimentation," and "dilution," then Lake Ontario water, depleted of its oxygen, sedimented with a bed of filth, and diluted with sewage, will remain unfit to serve as a source of pure water supply to Toronto, filtered or unfiltered.

Mayor Geary attempted to face the question as a Controller. Just how he handles it as Mayor depends the resultant efficiency of his term of office.

### THE "TELEGRAM" AND TORONTO'S PURE WATER SUPPLY PROBLEM.

The Toronto "Telegram" has done noble work in bringing before the citizens the problem of Toronto's pure water supply.

At their own initiative they have procured data and evidence that it is possible to extend the water pipe into deeper and 62 per cent. purer water than at present, thereby helping on the problem to a satisfactory solution.

The basis of the "Telegram's" argument has, however, we think, not been broad and wide enough. They appear to say: "**The sewage contamination soaks and penetrates so far and no farther.**"

Of course, there is a limit to the zone of contamination, but that limit fluctuates with winds and currents, and it is impossible to fix definitely the limit.

The "Telegram" argument appears to be based on the assumption that Lake Ontario is quiescent, and that penetration of sewage is merely a question of quantity and distance, whereas sewage, either floating, sedimented, or mixed, "bloweth where the wind listeth," at the mercy of every current and wave roll.

If the "Telegram" will help to teach the people of Canada the maxim, "**Prevention is better than cure,**" then our streams and lakes, even to the shore line, may be preserved pure and undiluted, and the paper add to its giant services to this people.

### GREATER TORONTO AND TORONTO'S PURE WATER SUPPLY PROBLEM.

Toronto's pure water supply problem must be based on the faith that Toronto will grow into Greater Toronto.

It may be only a proposition at the present time to discharge 30,000,000 gallons per day of crude liquid sewage into Lake Ontario  $3\frac{1}{2}$  miles from the water supply intake.

It will become a serious problem emptying 100,000,000 gallons per day of crude liquid sewage into Lake Ontario  $3\frac{1}{2}$  miles from an intake drawing 100,000,000 gallons of water for human consumption.

The adoption of a policy that the lake shore water can take care of Toronto's sewage problem by "oxidation," "sedimentation," and "dilution," and continue to supply pure water, is but the policy of a moment.

What is more crucial to the continued welfare, health and prosperity of Toronto than a ready and abundant supply of pure Ontario Lake water, independent of the temporary failures attached to all methods of water purification?

What is more absolutely apparent than that with Toronto's progress Lake Ontario water will become more and more impure by an increased discharge of unpurified sewage?

The policy of requiring the people to continue to contaminate its beautiful lake with crude liquid sewage, and use it as a sewage disposal area from which filtered water must be drawn for human consumption is a policy which requires reviewing.

### SEPTIC TANK PATENT CLAIMS.

We publish a circular copy of a letter sent out to Ontario municipalities by the Ontario Provincial Board of Health. The circular appears to speak for itself. No demands are made for benefits from septic action in the past. Those who wish to continue enjoying the benefits of so-called "septic action" may, however, pay 5 per cent. on the cost of the works. Those who agree to clean their tanks out periodically and so avoid the benefits of so-called "septic action" would appear to walk out of prison free men.

The statement is simply forwarded for the information of the municipalities. It appears, however, to constitute an easy "get out."

Dear Sir,—Information having been received that the holders of the American patent in respect to septic tanks have intimated to municipalities their intention of entering action for past infringement of the aforesaid patent, I beg to notify you that upon instructions of the Hon. the Minister a conference was held with a representative of the Cameron Septic Tank Company, and an offer was received from the company by which municipalities could effect a settlement, the basis being as follows:

The company is willing to waive any penalties for past infringement. Those municipalities which have installed the septic process and those contemplating such installations to pay the Cameron Company 5 per cent. of the cost of such plant as a license fee to cover the remaining life of such patent.

This statement is simply forwarded for the information of your municipality. Yours truly,

(Signed) C. A. Hodgetts, M.D.

Chief Health Officer of Ontario.

Toronto, March 9th, 1910.

### NEW INCORPORATIONS.

**Saskatoon, Sask.**—Maddaford & Lawson Company. Canadian Land & Investment Company.

**Beauharnois, Que.**—J. W. Kilgour & Bros., \$300,000. J. W. Kilgour, J. Wilson, R. W. Kilgour.

**Regina, Sask.**—Regina Transfer Company. Eggo-O Baking Powder. Constructors, Limited.

**St. John, N.B.**—New Brunswick United Typewriter Company, \$5,000. J. J. Seltz, T. Byrnes, A. H. Goodenow.

**St. Catharines, Ont.**—Ontario & Western Co-operative Fruit Company, \$75,000. M. Moylan, I. Sudaby, R. Gowans.

**Doaktown, N.B.**—New Brunswick Turpentine & Tar Company, \$1,000,000. A. W. Kendall, B. Stein, F. H. Kendall, Montreal.



# A PAGE OF COSTS

**ACTUAL, ESTIMATED and CONTRACTED**

### COST OF CONCRETE PILES.

In constructing a group of buildings for the United States Naval Academy at Annapolis it was found necessary to put in over 2,000 piles. It was found upon investigation that if concrete pile were used there would be considerable saving. Concrete pile were used and the following itemized figures are in the case of wood estimated and in the case of concrete actual:—

**Comparative Cost of Wood and Concrete Piles—Wood Piles.**

2,193 piles, at \$9.50 .....	\$20,835.50
4,542 cubic yards excavation, at 40 cents .....	1,816.80
3,250 cubic yards concrete, at \$8.....	26,000.00
5,222 lb. I-beams, at 4 cents.....	208.88
Shoring and pumping .....	4,000.00
<b>Total cost .....</b>	<b>\$52,861.18</b>

**Concrete Piles.**

855 piles, at \$20 .....	\$17,100.00
1,038 cubic yds. excavation, at 40 cents .....	415.00
986 cubic yards concrete, at \$8.....	7,888.00
Shoring and pumping .....	.....
<b>Total cost .....</b>	<b>\$25,403.00</b>
<b>Difference in cost .....</b>	<b>\$27,458.18</b>

### COST OF LIGHTING GAS.

During 1909 at Kingston, Ont., the city gas cost 47.3 cents per 1,000 cubic feet at the station meter and 53 cents at the consumer's meter. The fixed charges brought the cost up to \$1 per 1,000 cubic feet.

Gas was sold at \$1.08 including the meter rent and 99 cents excluding the rent:—

	per 1,000 cu. feet.
In 1908 the cost was.....	\$1.06
" 1907 " .....	1.26
" 1906 " .....	1.23

### COST OF ELECTRICITY.

At Kingston, Ont., during 1909 electricity cost per kilowatt hour:—

	At Station Meter	At Consumers' Meter
During 1909 .....	\$1.84	\$2.17
" 1908 .....	1.87	2.16
" 1907 .....	1.04	2.36
" 1906 .....	1.87	2.28

The following rates were received for electricity during 1909: For lighting, 9.7 cents a kw.; for street arc lighting, 4.5 cents; for street railway power, 1.62 cents. Lighting for street arc lamps was furnished at a slight loss, about \$173 on the year.

### METHOD AND COST OF TRENCHING.

Among the expensive improvements carried on in urban municipalities, water mains and sewers form a very consider-

able item. Anything that will cut down expense to the municipality will increase the volume of work to be done.

From the engineers and contractors point of view any machinery or invention that will lessen uncertainty will increase his profits and will be acceptable to him.

A machine that is becoming quite popular for trenching work is the traction, ditcher and Messrs. Laurin & Leitch, of



**Buckeye Ditcher.**

Beaver Hall Square, Montreal, have used in their work at Westmount with success a particular type of traction trench, the Buckeye, manufactured by the Buckeye Traction Ditcher Company, of Findlay, Ohio.

This machine consists essentially of a large wheel, to the rim of which are fastened the digging buckets. The wheel has no axle, but is supported by four pairs of rollers inside its rim. The wheel is supported between I-beams projecting from the rear of the trucks. These I-beams can be quickly raised or lowered by the operator, so that the bottom of the wheel can cut to the exact depth and grade desired. By sighting along range poles stuck in the ground ahead of the machine, the operator can not only keep on line with his trench, but he can keep the bottom of trench exactly to grade. The machine is self-propelling and moves steadily forward, leaving the completed trench behind. In digging a trench 26 inches wide by 7 feet deep in tough clay, the ditcher was geared to travel at a speed of two feet per minute.

If kept up without interruption for ten hours this would mean 1,200 lineal feet of trench.

As to the general cost of operation and the average daily output a fair estimate would be as follows: It takes three men to run this machine—an operator, a fireman, and a rigger or oiler. In addition to this, add half the wages of a blacksmith. One blacksmith readily takes care of two machines. The 24 horse-power engines that run the machine average 1,500 pounds of coal per ten hours of steady work. The water is hauled in a tank; and, as one of the teams engaged in backfilling is used for hauling the water at intervals, there is really no appreciable charge for water. If the water haul were long, its cost could be easily estimated by allowing a gallon of water for each pound of coal.

The daily work of such a machine has been as high as 1,200 lineal feet 26 inches wide by 7 feet deep in ten hours under good management and with a skilled operator. This would mean only 700 cubic yards per day. But with an operator of short experience, a fair day's work was 700 lineal feet and a good day's work was 900 lineal feet.

Laurin & Leitch found that they could cut two feet of frost and in an eight-foot trench make 350 lineal feet in a little over eight hours.

The average cost of operating a machine would be as follows:—

	Per Day.
1 operator .....	\$ 4.50
1 fireman .....	2.50
1 oiler .....	2.50
1 labourer .....	1.75
½ blacksmith .....	1.30
Coal—½ ton .....	2.50
<hr/>	
Total per day .....	\$15.05

It will be plainly seen that by good handling in favourable conditions the cost can be cut to about 3 cents per cubic yard.

Of course different conditions will vary this price considerably; but these figures show conclusively the advantages of these machines.

◆ ◆ ◆

**COST DATA OF ROAD BUILDING.\***

**C. R. Wheelock, C.E., Orangeville, County Engineer of Peel.**

Highway improvement is at the present time a live question in the Province of Ontario, a question which demands the attention of every unit of government from the Village and Township Councils to the Legislature. The old systems of road building and management, which have been in vogue for the last fifty years, are now generally admitted to be totally inadequate for the changed conditions and are fast becoming obsolete. Much credit is due the Provincial Public Works Department, for the information given to the public in respect to scientific road building. The statistics given by this Department go to show that much money has been wasted through wrong methods, and the necessity of placing road construction and administration on a correct basis.

At the present time the township, the county and the province are providing means for the construction and maintenance of country roads, and the cost data given in this paper are based on the actual cost of roads built in the County of Peel according to the Regulations of the Public Works Department in respect to highways.

Although it is getting away from my subject, I would

\*Read before the Good Roads' Association.

like to say here, that I consider the Highway Improvement Act has done a good work in establishing County Systems of good roads. But the roads on the County Systems are not connected, and there is no doubt the time has come when we should have a Provincial System of well designed, well constructed, continuous roads, to meet the conditions of the present time. It is obvious that a system of main roads, connecting links between cities and towns, such as would be taken into a Provincial System, cannot fairly be built and maintained at the expense of the rural municipality. For an example, take the Lake Shore Road through the County of Peel, which is the main highway between the cities of Toronto and Hamilton. It is estimated that more than half of the travel over this road is non-resident. On this highway, we have built about three miles of first-class stone road, at a cost of about \$10,000, for which we receive great praise from the people of Toronto, the people of Hamilton, and the people of the County lying West of us, by whom this road is used. Now the praise is all right as far as it goes, and we appreciate it very much. But it does not help to pay the piper. The only fair and equitable way to build roads of this description, and the only way we will ever get a system of trunk roads such as we require, is for the Government to take up a Provincial System. This appears to be the opinion held by the Deputy-Minister of Public Works, who says in his annual report on Highway Improvement for 1909,—“County road building is, however, a matter of magnitude and expense, as compared with the number and wealth of those upon whom it now commonly rests. Wherever it is left solely to the farmer it will be years before the condition of the roads will be adequate to the complete development of the resources of the country. It is a great public work in which the entire citizenship must bear a part of the cost.” And the only way we can get the entire citizenship to bear a fair part of the cost is for the roads to be built and paid for by the Province. These roads would be object-lesson roads for the sections through which they run. They would be a lesson for local road builders in the correct principles of road construction, and would demonstrate the advantage of properly built roads. And if in connection with the Public Works Department a laboratory was established, where samples of materials proposed to be used could be sent for analysis and comparative tests, it would further enable the municipality to ascertain the best local material available for road building.

The cost of roads varies widely in different localities, owing to the difference in the conditions under which they are constructed, such as nature of the soil along the proposed road, the general grade of road,—level, rolling, or hilly,—the condition of the road in respect to drainage, the cost of labor per day, the kinds of road building materials that are available, and how far they are situated from the road, the amount of travel over the road, and, if bridges or culverts are to be built, the span, the nature of the foundations, the kind of bridges or culverts now in use and the condition of each.

The extent of the plant required for road making is governed by the requirements of each case. The outfit for a macadam road usually consists of scrapers, plows, road machine, steam roller and sprinkler. The average outfit of this description will cost about \$3,800. Where stone is available for crushing, a crushing plant may be added, consisting of a crusher, elevator, revolving screen and bins, at a cost of about \$1,300.

An expert road foreman and machinery engineer are necessary to get the best results and to keep the work running smoothly. Competent men are available for these positions at from \$2.50 to \$3 per day.

In respect to inspection of bridge work, Mr. A. W. Campbell hit the nail on the head, in an address delivered by him a short time ago and reported in part as follows:—"Mr. A. W. Campbell emphasized the fact that there is a great need in Canada to-day for skilled inspectors who will act as the connecting link between the designing engineer and the contractor who undertakes the construction of public works. Deploable waste and extravagance was the result of municipalities engaging laymen, who were careless and pliable in the hands of a contractor. To the layman, the architect or engineer was apt to be a man of fanciful ideas, who could write long specifications and draw more or less intricate pictures. . . . As a public official charged with the handling of public funds, he had reached these conclusions from years of experience, and deemed it but right that he should give the public the benefit of his experience, and warn them in the interests of good workmanship and economy. Contractors, however honest, were chiefly concerned in the profits accruing, not the perfection and durability of the work, and it might be accepted as an axiom that the quality of the work could not be left wholly to the contractor."

The cost of cement-concrete bridge work varies in proportion to the cost of the material for construction delivered at the work. For example, take two arches of similar design built in the County of Peel last year. In one case the crushed stone, sand and gravel cost \$2 per cubic yard delivered at the work, the cement was teamed about 10 miles, and the price paid for the concrete was \$7.15 per cubic yard. In the other case, the crushed stone cost \$1.50 per cubic yard, the sand and gravel 40 cents per cubic yard, the cement was teamed ½ mile and the price paid for the concrete was \$5.75 per cubic yard. The minimum price paid for concrete in arch bridges was \$5, and the maximum \$8 per cubic yard. The minimum paid for concrete in abutments was \$5, and the maximum \$5.75 per cubic yard. The price paid for concrete covered excavating and refilling. The price paid for reinforced concrete bridge floors was from 20 cents to 25 cents per square foot. The steel for reinforcing in arches and flat top concrete bridges cost about 2½ cents per pound. The railing used on most of our concrete structures last year was two lines of 2-in. gas pipe with globe fittings, which makes a strong railing with a good substantial appearance at a reasonable cost. The cost of the railing painted and complete was 64 cents per foot.

The wages paid on the work were as follows:—

Ordinary labourers, \$1.50 to \$1.75 per day; road foremen, \$2 to \$2.50 per day; machinery engineers, \$2.50 per day; teams, \$3.50 to \$4 per day.

The cost of operating road machines was from \$13.50 to \$14.50 per day. In some cases traction engines were used on these machines instead of horses with good results. The cost if operating was less, and it is estimated that on a clay road and in hot, dry weather, nearly twice as much work can be done.

The cost of operating steam rollers was from \$3.90 to \$4.50 per day, to this may be added the cost of sprinkling \$4 per day, making the total for rolling and sprinkling about \$8 per day.

For the roads in the south part of the county crushed stone was brought in by rail, as satisfactory local material was not available. This added very much to the cost of these roads. In some cases the freight was double the price of the stone, f.o.b., at the quarry.

The following data gives in tabulated form the details relating to the dimensions, cost, etc., of several roads built on the County of Peel Road System in 1908 and 1909:—

Road No. 1.—Well graded, knolls cut down and hollows raised. Metal consolidated with a steam roller. As no local material was available, crushed stone was brought in by rail. The freight on about one-half the stone was 65 cents per ton, and on the remainder, which was delivered at another station, \$1 per ton. The price of the crushed stone f.o.b., at the quarry was 50 cents per ton.

Road No. 2.—Well graded. The gravel was evenly spread on the road early in the summer, without being rolled, and in the fall when the gravel was partly consolidated by the travel over it, it was gone over a second time, the ruts filled and the road recrowned.

Road No. 3.—Similar to No. 1, with the exception that the stone was all shipped to the same station, the freight being 65 cents per ton.

Road No. 4.—This was an old stone road, wide and flat on top, the grading consisted mainly of cutting off the shoulders, although in some places it had to be regraded and ditched. Crushed stone was placed in the centre of the road 9 feet wide, and along each side of this a strip of gravel about 3 feet in width, forming a boxing for the stone and making

No.	Location.	Grading.		Class of metal.	Road Metal.						
		Width of grade.	Cost per mile.		Width of metal.	Depth of metal.	Freight on metal.	Length of haul for teams.	Cost per mile.	Total cost per mile.	
					(Consolidated).						
					Feet.	Inches.		Miles.			
1.	Ching'sy	28'	\$126	Crushed stone.	9	7	\$1,034	1¼	\$3,145	\$3,271.00	
2.	Caledon	24"	195	Pit gravel.	7	9	Local	1	685	880.00	
3.	Toronto Tp.	24"	175	Crushed stone	9	8	1,005	3½	3,557	3,730.00	
4.	Toronto Tp.	27"	145	Crushed stone & pit gravel.	15	4	857	Stone ½ gravel 2	2,170	2,315.00	
5.	Ching'sy	27"	200	Crushed stone	8	6	876	1¼	2,808	3,008.00	
6.	Caledon	24"	272	Pit gravel.	7	8	Local	1	528	800.00	
7.	Toronto Tp.	22"	190	Crushed stone.	9	8	940	2¼	3,214	3,404.00	
8.	Ching'sy	24"	200	Crushed stone & screened gravel.	8	6	Local	2½	1,750	1,950.00	
9.	Toronto Tp.	26"	85	Gravel.	8	9	Local	...	650	1,115.00	
				Clay	9	5	.....	...	480		

the total width of the metal about 15 feet. The metal was well consolidated with a steam roller.

Road No. 5.—Similar to No. 1, except that the stone was all shipped to the same station and that the freight was 60 cents per ton, and the stone f.o.b., at the quarry, 65 cents per ton.

Road No. 6.—Similar to No. 2.

Road No. 7.—Similar to No. 3.

Road No. 8.—Well graded, knolls cut down and hollows raised. The metal was well consolidated with a steam roller. The metal used was a course gravel mixed with stones, which was run through the crusher and revolving screen.

Road No. 9.—This was a short piece of road built as an experiment. The soil was very light sand.

### REPORT ON TEMPORARY TRESTLING\*

(Continued from page 244).

whether there is likely to be much mud or water to contend with. All the latter information should be on file in the superintendent's office so as to enable him to determine what kind and manner of temporary work will best meet the requirements. If not too deep the opening may be cribbed up with ties, if very deep it may be that foundation can be secured for temporary framed bents, and if the bottom is soft, much water or a swift current, it will probably be necessary to drive piles.

These questions, having been disposed of, the next thing is to determine what debris is in the way of constructing the temporary structure. Are their engines and cars in the washout? If so where is the wrecking outfit, and how soon can the obstructions be moved? Also where is the necessary material for such temporary work, as it is desirable to construct, and can it be brought to the burnout or washout in time?

These questions are important and must be answered by everything being in readiness before the work can progress very rapidly in any particular case.

#### Crib Work.

One method of bridging a shallow washout is by using a crib work of ordinary track ties and old logs. This method is the most expeditious, as a large number can be built at the same time.

The general method of construction is as is shown in the sketch.

Many consider this a rude method of constructing temporary work, and as it is usually constructed by men of little experience and very hurriedly, it often proves unsatisfactory. When built in a proper manner, however, they serve their purpose well. The crib should be brought up as nearly level as possible, care being taken to select ties of the same thickness for each course. If double cribs are necessary the method of construction shown in the sketch is the most satisfactory, as there is less swaying and they are more easily constructed than two separate cribs. The cribs are capped with long stringers 12 by 14 inches, or equivalent size, and the ties and track laid on them as in ordinary work. The writer has seen cribs of this kind in use 12 feet high.

#### Framed Bents.

These are constructed along the same lines as more permanent ones. The principal difficulty here is to secure a good foundation. Rip-rap stone is of valuable assistance in securing such. The stone is dumped promiscuously at the spot and then levelled off and the lower sill placed on it. Mud sills placed longitudinally are also much used.

#### Piles.

Piling, used where the bottom is soft or where water is encountered, is a common method of bridging a temporary gap. The pile-driver used should have a clear span of 16 to 20 feet in order to give sufficient panel lengths. A staging or platform close to the water is needed to support workmen who guide the point of the pile into place and in other ways assist the work.

#### Example of Very Rapid Work.

As an example of very rapid work in bridging a washout the following account is of interest:—

Heavy rains one hundred miles up the river caused a flood, which came down with a wave six feet high and washed out 2,222 feet of bridging and trestling. The structures washed away consisted of two 3-truss spans of 155 feet each, one 3-truss span of 130 feet, four deck plate girders each 44 feet and a pile trestle approach at either end. Besides the main gap 4,400 feet of track had also to be filled in by trestles or in the shallow places by tie crib work before the main washout could be reached.

The average depth of the washout to be bridged was 15 feet. Thirty-five foot piles with an average penetration of 13 feet were used, and in all 420 piles were driven in 122 bents. This means that 1.6 piles or 7 feet of bridge was completed in an hour. Panel length 15 feet. At each end two pile-driver crews and three trestle bridge gangs, or 36 men in all, were stationed, besides two train crews so that work could be carried on all the time. The pile-drivers were 20 feet extension, with steam turning gear and drop hammer weighing 3,100 lbs.

The method of work was to drive a bent of piles, saw them off, put on caps and sway braces, lay the stringers, ties and rails then move ahead and repeat the operation. All material was handled by the drivers, and towards the end it was necessary for them to run back 1,000 feet eight times for each panel. The progress of finishing the whole washout in 129 hours of actual work was phenomenal.

#### Best Method is to Prevent Washouts or Burnouts.

It is of the utmost importance that during severe rainstorms or time of freshets the section foreman and his men should be patrolling the track. If proper care is taken to signal approaching trains no wrecks or derailments should occur and the consequent loss of life and property due to them will be avoided. There have been incidents without number when, if some man equipped with a shovel had happened along at the right time he could have turned the course of the stream or placed some brush to prevent the initial wearing away of the bank. Here the same rule applies as in most of the ordinary affairs of life, namely, "an ounce of prevention is worth a pound of cure." Therefore while it is wise to have the necessary material for bridging a washout at convenient points it is much better to prevent such accidents from taking place.

**CONSULT OUR CATALOGUE INDEX** on page 6.

We can put you into immediate touch with the principal manufacturers of and dealers in all kinds of engineering and contracting equipment. A postcard to this department will insure the receipt of the desired catalogue.

**RELATIVE COST OF MUNICIPAL WORK DONE BY DAY LABOR AND BY CONTRACT.\***

By Harrison P. Eddy,†  
Consulting Civil Engineer, Boston, Mass.

**The Decreasing Efficiency of the Day Labor Forces and Some of the Causes.**

Among the various lines of investigation carried out by the late Boston Finance Commission were several which threw considerable light upon the relative efficiency of the contract and day labor systems and some of the causes of the inefficiency of the day labor forces of the city of Boston.

An effort was made to ascertain as nearly as possible the actual facts in all cases, and to reduce the conditions to figures thus eliminating opinions. The results of these investigations are, therefore, interesting and important as showing the results of conditions surrounding city departments, and not as exploiting theories of ideal conditions, which are rarely found in any city.

While most of the data refer to the city of Boston, it is believed that the lessons drawn from them are typical, and that similar results would be obtained from like investigations in many other cities.

**Relative Prevalence of Contract and Day Labor Systems.**

In order to ascertain the general municipal practice throughout the country in building waterworks and sewerage systems, a postal card inquiry was sent to all cities in Massachusetts and to all cities in the country exceeding 30,000 in population, as shown by the Census Bureau in 1905. The results of this inquiry appear in Table 1. The questions were so worded as to apply only to ordinary extensions, and it is probable that in some cases work upon new systems may have been done by contract, while ordinary extensions were made by day labor.

TABLE I.

**Relative Prevalence of Contract and Day Labor.**

**Sewer Construction in American Cities of Populations Exceeding 30,000 (not including Boston).**

Population.	Number of Cities of specified size (1905 Census Estimate).	Number of Cities enumerated.	Cities doing work wholly by Contract.	Cities doing work wholly by day-labor.	Per cent. of Cities doing work by Contract.
30,000—50,000 ...	67	31	20	11	65
50,000—100,000 ...	47	22	15	7	68
100,000—150,000 ...	14	8	5	3	63
150,000—200,000 ...	6	2	2	..	100
Over 200,000 .....	20	10	10	..	100
Totals .....	154	73	52	21	71
Outside of New England .....	126	51	48	3	94
New England, excepting Massachusetts .....	10	6	4	2	67
Massachusetts .....	18	18	1	17	6

\* Read before Section I. of the American Association for the Advancement of Science, December 28th, 1909.

† Of the firm of Metcalf & Eddy, consulting engineers to the late Boston Finance Commission.

**Relative Prevalence of Contract and Day Labor.**

**Water Pipe Laying in American Cities of Populations Exceeding 30,000 (not including Boston).**

Population.	Number of Cities of specified Size (1905).	Number of Cities enumerated.	Cities doing work wholly by Contract.	Cities doing work wholly by day labor.	Per cent. of Cities doing work by Contract.
30,000—50,000 ...	67	26	9	17	34.6
50,000—100,000 ...	47	15	5	10	33.3
100,000—150,000 ...	14	6	1	5	16.7
150,000—200,000 ...	6	2	..	2	....
Over 200,000 .....	20	9	4	5	44.4
Totals .....	154	58	19	39	33.0
Outside of New England .....	126	40	19	21	48.0
New England, excepting Massachusetts .....	10	3	..	3	...
Massachusetts .....	18	15	..	15	...

Postals were sent to 154 cities, and replies relating to sewerage systems were received from 73 cities, and relating to waterworks extensions from 58 cities.

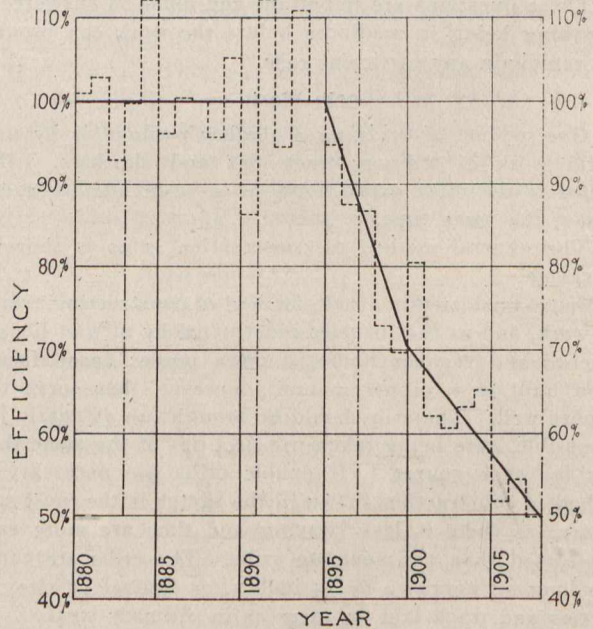
Of the 73 cities making replies to the inquiries relating to sewerage systems, 52 or 71 per cent. were found to be

DIAGRAM B.

**EFFICIENCY OF LABOR IN BOSTON WATER DEPARTMENT**

THE AVERAGE EFFICIENCY FOR THE 15 YEARS 1880-1894 HAS BEEN TAKEN AS 100%

DATA FOR THIS DIAGRAM HAVE BEEN REDUCED TO A UNIFORM BASIS OF WAGES AND HOURS FOR THE ENTIRE PERIOD



doing this class of work wholly by contract. Of the cities located outside of New England, 94 per cent. were found to be doing their work by contract, while but 67 per cent. of the cities in New England outside of Massachusetts were using this system, and in Massachusetts only 6 per cent. The prevalence of the day labor system in Massachusetts is very strikingly shown by these figures, which, it should be noted, are based upon replies from all of the eighteen cities

to which inquiries were sent. Putting it in another way, of the eighteen cities in Massachusetts one was doing its sewer work wholly by contract, while seventeen were doing similar work wholly by day labor.

Replies to the inquiries relating to waterworks extensions were received from fifty-eight cities, and of this number 33 per cent. were found to be doing the work wholly by contract. Outside of New England 48 per cent. of the cities have adopted the contract system, while in Massachusetts, of the fifteen cities making reply to the inquiries, all were found to be doing the work by day labor. The results of the inquiries relating to water pipe extensions are very similar to those relating to sewer construction, and both show very clearly that the day labor system is very widely adopted in Massachusetts, and much more prevalent in that State and in New England than throughout the remainder of the country.

**Comparative Costs of Day Labor and Contract Sewer Work in Various Cities.**

A comparison was made of the cost of building sewers in cities where work was known to be done by day labor with that in other cities where similar work is done by contract. These comparisons were confined to New England cities, and very largely to cities in Massachusetts.

To make this investigation less difficult and reduce the element of uncertainty as much as possible, the inquiry was confined to small pipe sewers from 8 to 12 inches in diameter. Since most sewers of this class built in Boston have been constructed under contracts (largely "gift" or non-competitive contracts), the number available for comparison was smaller than was desired. As the difficulty in selecting work done under comparable conditions was fully realized, and as such selection could only be made by engineers familiar with local conditions, an assistant was sent from place to place to interview the local engineers, who always very kindly, and at times at considerable inconvenience to themselves, carefully considered the conditions surrounding a large number of pieces of work, and advised which should be selected for use in this comparison. The number of sewers selected in each city was small, but included all which could be classed as being built under conditions enabling fair comparison within the last few years. While it is realized that this study may be criticized as being based upon fragmentary and possibly insufficient data, it is presented as comprising the best data which could be obtained after a long and earnest effort to get at the truth. Unfortunately, in no city except Boston was this class of work found to be done both by day labor and by contract, so that comparisons between the two methods in the same city were impossible, with the single exception noted.

(To be Continued).

**NEW INCORPORATIONS.**

**Haileybury, Ont.**—Miller Porcupine Gold Mines, \$2,000,000. G. G. T. Ware, O. L. Redfern. Porcupine Development Company, \$100,000. W. R. P. Parker, J. A. McEvoy, J. C. MacDonald.

**Toronto.**—Toronto Structural Steel Company, \$250,000. G. Grant, A. Dods, M. MacDonald. Ingersoll Engineering Company, \$200,000. E. G. Coombe, W. Breen, G. Gander. Toronto Play Grounds Association. J. J. Kelso, C. A. B. Brown, S. D. Mills. Traders, Limited, \$40,000. J. E. Day, J. M. Ferguson, E. V. O'Sullivan. Suburban Realty Company, \$40,000. J. S. Lovell, W. Bain, R. Gowans. Niagara & Ontario Steamship Company, \$150,000. F. T. Hutchinson, H. W. Crawford, C. Moller.

**ENGINEERING SOCIETIES.**

**CANADIAN SOCIETY OF CIVIL ENGINEERS.**—413 Dorchester Street West, Montreal. President, Col. H. N. Ruttan; Secretary, Professor C. H. McLeod.

Chairman, L. A. Vallee; Secretary, Hugh O'Donnell, P.O. Box 115, Quebec. Meetings held twice a month at Room 40, City Hall.

**TORONTO BRANCH.**

96 King Street West, Toronto. Chairman, A. W. Campbell; Secretary, P. Gillespie, Engineering Building, Toronto University, Toronto. Meets last Thursday of the month.

**MANITOBA BRANCH.**

Chairman, H. N. Ruttan; Secretary, E. Brydone Jack. Meets first and third Fridays of each month, October to April, in University of Manitoba, Winnipeg.

**VANCOUVER BRANCH.**

Chairman, Geo. H. Webster; Secretary, H. K. Dutcher, 40-41 Flack Block, Vancouver. Meets in Engineering Department, University

**OTTAWA BRANCH.**

Chairman, W. J. Stewart, Ottawa; S. J. Chapleau, Resident Engineer's Office, Department of Public Works.

**MUNICIPAL ASSOCIATIONS.**

**ONTARIO MUNICIPAL ASSOCIATION.**—President, Mr. George Geddes, Mayor, St. Thomas, Ont.; Secretary-Treasurer, Mr. K. W. McKay, County Clerk, St. Thomas, Ontario.

**UNION OF ALBERTA MUNICIPALITIES.**—President, H. H. Gaetz, Red Deer, Alta.; Secretary-Treasurer, John T. Hall, Medicine Hat, Alta.

**UNION OF NOVA SCOTIA MUNICIPALITIES.**—President, Mr. A. E. McMahon, Warden, King's Co., Kentville, N.S.; Secretary, A. Roberts, Bridgewater, N.S.

**UNION OF SASKATCHEWAN MUNICIPALITIES.**—President, Mayor Hopkins, Saskatoon; Secretary, Mr. J. Kelso Hunter, City Clerk, Regina, Sask.

**CANADIAN TECHNICAL SOCIETIES.**

**ALBERTA ASSOCIATION OF ARCHITECTS.**—President, R. Percy Barnes, Edmonton; Secretary, H. M. Widdington, Strathcona, Alberta.

**CANADIAN ASSOCIATION OF STATIONARY ENGINEERS.**—President, Charles Kelly, Chatham, Ont.; Secretary, W. A. Crockett, Mount Hamilton, Ont.

**CANADIAN CEMENT AND CONCRETE ASSOCIATION.**—President, Peter Gillespie, Toronto, Ont.; Vice-President, Gustave Kahn, Toronto; Secretary-Treasurer, Alfred E. Uren, 62 Church Street, Toronto.

**CANADIAN ELECTRICAL ASSOCIATION.**—President, N. W. Ryerson, Niagara Falls; Secretary, T. S. Young, Canadian Electrical News, Toronto.

**CANADIAN FORESTRY ASSOCIATION.**—President, Thomas Southworth, Toronto; Secretary, James Lawler, 11 Queen's Park, Toronto.

**CANADIAN MINING INSTITUTE.**—Windsor Hotel, Montreal. President, W. G. Miller, Toronto; Secretary, H. Mortimer-Lamb, Montreal.

**CANADIAN RAILWAY CLUB.**—President, H. H. Vaughan; Secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

**CANADIAN STREET RAILWAY ASSOCIATION.**—President, D. McDonald, Manager, Montreal Street Railway; Secretary, Acton Burrows, 157 Bay Street, Toronto.

**CANADIAN SOCIETY OF FOREST ENGINEERS.**—President, Dr. Fernow, Toronto; Secretary, F. W. H. Jacombe, Ottawa.

**CENTRAL RAILWAY AND ENGINEERING CLUB.**—Toronto, President, J. Duguid; Secretary, C. L. Worth, 409 Union Station. Meets third Tuesday each month except June, July, August.

**DOMINION LAND SURVEYORS.**—Ottawa, Ont. Secretary, T. Nash.

**EDMONTON ENGINEERING SOCIETY.**—President, Dr. Martin Murphy; Secretary, B. F. Mitchell, City Engineer's Office, Edmonton, Alberta.

**ENGINEER'S CLUB OF TORONTO.**—96 King Street West. President, C. M. Canniff; Secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter months.

**INSTITUTION OF MINING AND METALLURGY.**—President, Edgar Taylor; Secretary, C. McDermid, London, England. Canadian Members of Council:—Prof. F. D. Adams, J. B. Porter, H. E. T. Haultain, and W. H. Miller, and Messrs. W. H. Trewartha-James and J. B. Tyrrell.

**MANITOBA LAND SURVEYORS.**—President, George McPhillips; Secretary-Treasurer, C. G. Chataway, Winnipeg, Man.

**NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.**—President, S. Fenn; Secretary, J. Lorne Allan, 15 Victoria Road, Halifax, N.S.

**ONTARIO PROVINCIAL GOOD ROADS ASSOCIATION.**—President, W. H. Pugsley, Richmond Hill, Ont.; Secretary, J. E. Farewell, Whitby, Ont.

**ONTARIO LAND SURVEYORS' ASSOCIATION.**—President, Louis Bolton; Secretary, Killaly Gamble, 703 Temple Building, Toronto.

**ROYAL ARCHITECTURAL INSTITUTE OF CANADA.**—President, A. F. Dunlop, R.C.A., Montreal, Que.; Hon. Secretary, Alcide Chausse, Beaver Hall Square, Montreal, Que.

**WESTERN CANADA RAILWAY CLUB.**—President, Grant Hall; Secretary, W. H. Rosevear, 199 Chestnut Street, Winnipeg, Man. Second Monday, except June, July and August, at Winnipeg.

**AMERICAN TECHNICAL SOCIETIES.**

**AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS (TORONTO BRANCH).**—W. H. Eisenbeis, Secretary, 1207 Traders' Bank Building.

**AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—President, John P. Canty, Fitchburg, Mass.; Secretary, T. F. Patterson, Boston & Maine Railway, Concord, N.H.

**AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION.**—President, Wm. McNab, G.T.R., Montreal, Que.; Secretary, E. H. Fritch, 962-3 Monadnock Block, Chicago, Ill.

**AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Secretary, C. W. Hunt, 220 West 57th Street, New York, N.Y. First and third Wednesday, except July and August, at New York.

**AMERICAN SOCIETY OF ENGINEERING-CONTRACTORS.**—President, George W. Jackson, contractor, Chicago; Secretary, Daniel J. Hauer, Park Row Building, New York.

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—29 West 39th Street, New York. President, Jesse M. Smith; Secretary, Calvin W. Rice.

**WESTERN SOCIETY OF ENGINEERS.**—1735 Monadnock Block, Chicago, Ill. Andrew Allen, President; J. H. Warder, Secretary.

# ENGINEER'S LIBRARY

## THE CANADIAN ENGINEER'S MONTHLY INDEX OF CIVIL ENGINEERING LITERATURE.

The purpose of this monthly index is: To inform engineers and contractors of the literature published on those subjects in which they are especially interested, the character of the article and the journal in which it appeared. **We do not index in this section articles that appear in The Canadian Engineer.**

Periodicals containing articles indexed, should be ordered direct from the publishers.

### LIST OF PERIODICALS INDEXED.

**Canadian Society of Civil Engineers Proceedings.**—(Can. Soc. C.E. Proc.), Montreal, Can., m., 4 x 7 in., \$1.25.

**Canadian Cement and Concrete Review.**—(Can. Cem. and Con. Rev.), Toronto, Ont., m., 9 x 14, 15 cents.

**Contractor.**—(Contr.), Chicago, Ill., bi-w.; 7 x 10 in., 20 cents.

**Engineering—Contracting.**—(Eng.-Cont.) Chicago, Ill., w.; 9 x 12 in., 10 cents.

**Engineering News.**—(Eng. News), New York, N.Y., w.; 10 x 14 in., 15 cents.

**Engineering Magazine.**—(Eng. Mag.), New York, N.Y., 7 x 10 in., 25 cents.

**Good Roads Magazine.**—(Good Rd. Mag.), New York, U.S.A. 9 x 12 in., M., 10 cents.

**Machinery.**—(Mach.), New York, N.Y., m., 7 x 11 in., 20 cents.

**Municipal Journal and Engineer.**—(Mun. JI. and Eng.), w., New York, N.Y., 9 x 12, 10 cents.

**Municipal Engineering Magazine.**—(Mun. Eng. Mag.), Indianapolis, Ill., m., 7 x 10 in., 25 cents.

**Power and Engineer.**—(Pow.), New York, N.Y., w.; 9 x 12 in., 5 cents.

**Railway Age Gazette.**—(R. R. Age Gaz.), New York, w.; 8 x 11 in., 15 cents.

**Surveyor, The.**—(Sur.), London, Eng., w.; 6 x 11, 10 cents.

**Engineering.**—(Engr.), London, Eng., w.; 12 x 15 in., 15 cents.

\*Illustrated.

### MISCELLANEOUS.

**Expansion Joint\***—5 pp., Pow., Feb. 22. Describing several standard pipes. Showing the purposes for which they are best adapted, their construction, how they are used.

**Steam Turbines\***—5 pp., Pow., Feb. 22. The elementary theory and a simple explanation of impulse and reaction forces, and how these forces are combined in modern turbines of impulse and reaction types.

### LIGHT, HEAT AND POWER

**Power Plants\***—One p. Eng. News, Feb. 24. An article describing the designing for hydraulic plants subject to reduced heads by high water.

### CONCRETE

**Aqueduct Lining\***—1 pp., Eng. News, Feb. 24. The lining of reinforced aqueduct which has steel frame; Illinois and Mississippi Canal.

**Concrete Sewer\***—3 pp., (Mun. JI. and Eng.). Difficult construction because of flood water.

### SEWAGE AND WATER

**Sewage Disposal Plant\***—6 pp., Cont. Feb. 1. The construction of the sewage disposal plant at Baltimore, U.S.A. This plant is said to be the largest plant in the world.

**Sterilization**—1 pp., (Mun. JI and Eng.). The use of chloride of lime in connection with water purification.

### ROADWAYS AND PAVEMENTS

**Sidewalks\***—4 pp., The Cont., Feb. 15. The cost of building sidewalks, Chicago, and method of construction.

### RAILWAYS

**Track Elevation\***—6 pp., Eng. News, Feb. 10. An article describing the design construction of the elevated tracks for the Chicago, Milwaukee and St. Paul Ry.

**Car Wheels\***—3 pp., Eng. News, Feb. 10. The aerial contact between car wheels and rails. The article is based on tests made by the Lake Erie and Western Railway.

**Tractive Power of Locomotives\***—1 pp., Rail, Age, Jan. 28. An article comparing the tractive power of simple and compound locomotives.

### BOOK REVIEWS.

**Electric Power Conditions**, by Wm. A. Del Mar. Published by D. Van Nostrand Company, New York, pp. 339, Ill 69. Price \$2.00 net.

The book presents in a concise manner the general engineering considerations which affect the design of electric power conductors. The early chapters discuss the mechanical and electrical characteristics of the materials used in the manufacture of conductors for electrical purposes. These are followed by chapters on the carrying capacity of conductors, insulation, and the insulating of conductors for both low and high potentials. The author briefly discusses the design of conductors for lighting systems, railway feeders and alternating current transmission lines, suggested forms of specifications for wires and cables are submitted, with a discussion on the insulation and the standard methods testing. The installation of cables is briefly touched upon with a chapter on third rail circuits. The text has been supplemented by an appendix which explains more fully the basis of formulae used. The information contained in this book is sufficient to enable one to secure a working knowledge of the design of electric conductors.—F. A. G.

**The Protection of Railroads from Overhead Transmission Line Crossings**, by Frank F. Fowle, I.B. Published by D. Van Nostrand & Co., New York. Pp. 69, ill. 35. Price net, \$1.50.

As its name implies the book deals with the construction of overhead crossings of railroads, and was originally prepared as a paper for presentation before the Association of Railway Telegraph Superintendents, at their annual meeting of 1908. It discusses the damage and the effect of failures incident to faulty construction of overhead high tension lines, with examples of the present practice in the construction of these lines. A number of typical con-

structions for protection at crossings are described with illustrations. The general features and engineering requirements of the design of crossing structures are discussed and the author suggests a typical design for a 22,000 volt crossing which in many particulars meets with the present practice for such work.—F. A. G.

**Direct and Alternating Testing**, by Frederick Bedell, Ph.D., assisted by Clarence A. Pierce, Ph.D. Published by D. Van Nostrand Company, New York. Pp. 265. Numerous illustrations. Price \$2.00.

A noticeable feature of the book is the introduction to all tests which discusses the underlying principles and the objects to be accomplished, followed by a concise description of test instead of a standard set of rules for conducting them. The descriptive matter has been systematically arranged so as to instruct the student in proper method of performing the tests, pointing out operations to be avoided. Standardized rules for tests have been discussed and more has been left for the student to work up, giving him the maxim benefit from each test. The book is divided into seven chapters which deal with Direct current generators, Direct current motors, Synchronous Albricator single phase currents, Transformers Polyphase currents, Phase changes and potential regulators. Each chapter contains an outline study of the subject, followed by detailed tests. The description of the test procedure is clear and thorough. A feature is its accuracy and brevity. The book is well written and will be found of value on the test floor as well as in the laboratory.—F. A. G.

**Cement in Seawater**, by A. Poulsen of Denmark. Published by the Society of Portland Cement Manufacturers. 60 pp. and diagrams. Price \$1.00.

This pamphlet is a summary of extensive tests undertaken by the above society on the coasts of Denmark, Norway and Sweden and extending over a period of ten to twenty years.

The material tested was moulded into large blocks and placed in groins in fully exposed breakwaters. Cement was supplied by most of the well known Scandinavian plants and the standard proportions 1:1, 1:2, and 1:3 were tested.

In spite of the blocks having been protected with wood considerable erosion was shown, a number of the blocks having been quite destroyed. The results are well summed up in diagrams and would go to show that any loss of weight is due to mechanical rather than chemical action the crushing strength of all proportions being about as great at the end of ten as at one year.—A. C. O.

**Structural Details or Elements of Design in Heavy Framing**.—By Henry S. Jacoby, Professor of Bridge Engineering in Cornell University, New York. John Wiley & Sons, London, England; Chapman & Hall, Limited. Cloth, 6 x 9 ins., pp. 368, 339 figures in the text, 6 folding plates. \$2.25 net.

While the publication of a treatise on the details of timber construction might appear somewhat belated in this age of steel and concrete and vanishing forests, the extensive use to which timber is still put is ample justification for Professor Jacoby's book. The subject matter was originally collected and employed for a course of instruction in the College of Civil Engineering of Cornell University, but it will be found of considerable value to the practical designer as well as to the student.

The work is divided into six chapters as follows: Fastenings used in Framing, Joints used in Framing, Wooden

Beams and Columns, Wooden Roof Trusses, Examples of Framing in Practice and Timber Tests and Unit Stresses. Under these headings the various elements of heavy framing are discussed, where possible in the light of experimental investigation. Bolts, washers, nails, spikes, screws, dowels, treenails, keys, straps and other apparently insignificant details are given, the attention which their importance in timber construction demands. The digests of laboratory tests on the holding power of nails, spikes and screws are of particular interest. Many examples of joint details are submitted in the course of the text which cover practically the whole field of timber, framing such as tabled and plain fish-plate joints, lap and scarf joints, dove-tail joints, mortise-and-tenon joints, step joints, angle blocks, metal shoes, etc. Estimates of cost for comparative purposes are given in a number of instances where alternative details are discussed. Many excellent cuts, including six full-page plates, show the complete makeup and details of roof and bridge trusses, beams and posts, arch centreing, trestles and other structures of timber. The book throughout partakes of the excellent character of the other works of which Professor Jacoby is author or joint-author, and will prove a valuable addition to the library of the structural designer.—C. R. Y.

**Secondary Stresses in Bridge Trusses**.—By C. R. Grimm, C.E., New York: John Wiley & Sons, Montreal; Renouf Publishing Co. Cloth, 6 x 9 ins., pp. 140, 60 figures in the text. \$2.50.

Until the publication of this book, few English-speaking engineers were aware of the considerable literature on the subject of secondary stresses which has grown up in German during the last twenty-five years. In examining the valuable bibliography of secondary stresses at the end of Mr. Grimm's work one is struck with the fact that out of forty-four references thirty-eight relate to articles or works in German.

The author of this, the first book in English devoted to the treatment of secondary stresses, disclaims any attempt at a pretentious work on account of the great amount of time required for such an undertaking. He practically confines himself, therefore, to elucidating the methods of computing the secondary stresses in trusses due to riveted connections. Four principal methods are presented—those of Manderla, Mueller-Breslau, Ritter and Mohr and the principle of least work is also shown to lead to the desired results, although its use adds to the labor of solution. In illustration of the methods explained the computations for thirteen trusses of varying types are given, the majority of these examples being quoted from foreign sources, although three cases have been worked out by the author, while some of the trusses differ in form and make-up from those adopted in American practice, they serve well to illustrate the calculation of secondary stresses in a variety of cases.

Following the discussion of the major topic of the book is a chapter on other causes of secondary stresses than riveted joints in main trusses. These causes as cited by the author are: Eccentricities, Loads between Panelpoints in the Plane of the Truss, Loads between and at the Panelpoints of a Member supposed to turn freely around a Pin, Changes in Temperature, Misfits, Brackets on Posts, Unsymmetrical Connections, Curved Members, Pin Joints, Friction at Supports, Cross-Frames, and Yielding of Foundations and Settlements of Masonry. None of these various causes are given full and comprehensive treatment in the present work, and it is to be hoped that in a future edition, this portion of the book will be expanded. A theoretical



discussion of impact of doubtful value is included because of its importance when considered in conjunction with secondary stresses.

A work of the kind under consideration is because of its nature of interest to only comparatively few, but to those few it will be found of considerable value. Those who find it necessary to become familiar with this somewhat intricate subject owe a debt to the author for placing before them in convenient form the best work of the German investigators.—C. R. Y.

**The Recognition of Minerals**, by C. G. Moor, M.A., F.L.C., with monographs by Donald A. MacAllister, Assoc. R.S.M., F.G.S. 245 pages; price \$2.00. Published by the Muncy Journal, London.

The author has written a book with the assistance of Mr. MacAllister, which should appeal to the prospector and traveler interested in economic mineralogy as one containing a wealth of useful and well arranged information.

The notes on prospecting are brief but complete giving the reader an outline of the qualifications and equipment necessary for a prospecting tour laying stress on the physical and mental requirements of the man. Directions are given for the taking and preparing field samples for subsequent analysis.

The section devoted to structural geology and ore deposits is modern and compiled from the best supported theories advanced by modern scientists furnishing the reader with short, interesting and lucid instruction in geology and ore deposits. A glossary of terms used completes the section.

The author has adopted as a method of classification for the recognition of minerals the color and lustre of specimens this method is very unusual and past experience has generally proved it unreliable as compared with the more usual method of using the streak. Particular stress and very full instructions are given for blow pipe analysis. The explanatory notes on the various minerals are very full and tabulated in such form as to make mineral identification comparatively easy. Very interesting information is included on the radio active minerals which since the discovery have played such an important part in the sciences. A second classification is arranged of the metallic and non-metallic elements giving as to their economic uses, market value, and probable future, also many standard qualitative and quantitative chemical tests.

Useful data is given as to the necessary features of an ore deposit as regards location, transportation, labor, power, fuel, etc., before it can hope to be exploited as a deposit of economic importance. The author has endeavored to give printed directions on panning, vanning, amalgamation and the various other field methods of testing out a discovery. Brief passages explain the modern methods of handling a proven economic ore deposit in getting the ore out of the mine through the mill and to the smelter with the methods adapted to various ores. The appendix treats of the extraction of gold either by milling, amalgamation or cyanation. Also includes crystallographic tables of minerals.

The book is copiously and carefully indexed, but the author has been unfortunate in his selection of style, binding and paper, which are of an inferior quality and fail to do justice to a work which is a credit to the writer and his associate and a useful addition to the library of a prospector or traveller.—R. G.

## PUBLICATIONS RECEIVED.

**Electricity**, by H. M. Hobart, B. Sc. Size 5 x 8, pages 207, price \$1.80. Published by Copp, Clark & Co., Toronto.

**American Waterworks Association**, proceedings for 1909, papers read at Milwaukee, Wis., June 7-12, 1909, size 6 x 9, pages 800. Published by J. M. Diven, 14 George St., Charleston, S. C.

**Concrete Bridges and Culverts**, by H. G. Tyrell, Civil Engineer. Size 4 x 7, pages 250, price \$2.50. Published by The Myron C. Clark Publishing Co., Chicago.

**Technical Dictionary**, volume five. Railway construction and operation. This dictionary has these terms in German, English, French, Russian, Italian, Spanish. Size 7 x 4, price \$3.50. Published by The Copp Clark Co., Toronto.

**Reinforced Concrete Structures, Diagrams for Designing**, by G. F. Dodge, M.W.S.E. Size 12 x 15, pages 100, price \$4.00. Published by The Myron C. Clark Publishing Co., Chicago.

**Tests of Two Types of Tile-Roof Furnaces under a Water-Tube Boiler**, by J. M. Snodgrass, has been issued by the Engineering Experiment Station of the University of Illinois as Bulletin No. 34. This bulletin reports a short series of boiler trials made for the purpose of comparing boiler performance when operating with two types of furnace roofs. Copies of Bulletin No. 34 may be obtained gratis upon application to W. F. M. Goss, Director of the Engineering Experiment Station, University of Illinois, Urbana, Illinois.

**A Study of Base and Bearing Plates for Columns and Beams**, by N. Clifford Ricker, Bulletin No. 35 of the Engineering Experiment Station of the University of Illinois. This bulletin contains formulas and tables for use in designing steel and iron plates of the usual forms. Copies of Bulletin No. 35 may be obtained gratis upon application to W. F. M. Goss, Director of the Engineering Experiment Station, University of Illinois, Urban, Illinois.

**Wrought-Pipe Drainage Systems**, by J. J. Cosgrove. Pages 150, size 6 x 9, price \$2.00. Published by Standard Sanitary Mfg. Co., Pittsburgh, U.S.A.

**Computation of Area**, by Frank J. Gray, A. M. Inst. C.E., F.R.G.S. 65 pages, size 5 x 6, price 35 cents. Published by St. Bride's Press, Ltd., 24 Bride Lane, Fleet St., E. C. London, Eng.

### The Canadian Engineer has a National and International Circulation

Canadian Engineer,  
62 Church St., Toronto.

Dear Sirs,—We placed an advertisement with your paper a short time ago to the effect that we were open to receive catalogues from manufacturers and as a result we are in receipt of many from all parts of the United States and Canada—south to Denver, east to Halifax and west to Vancouver, thus showing how widely read the Canadian Engineer is.

B. F. MITCHELL,  
Sec. Edmonton Engineering Society,  
Edmonton, Alta.

Feb. 19th, 1910.

**SOCIETY NOTES.**

**Engineering Society, Toronto University:**—At the annual meeting of the Engineering Society of the University of Toronto, held last Friday night in the Engineering building, the following were elected officers for next year:—President, A. D. Campbell; 1st vice-president, R. L. Dobbin; vice-president for Civil Engineering and Architecture section, W. H. Murphy; for Mechanical and Electrical sec-



**Mr. W. D. Black,**  
President of the Engineering Society, 1909-10

tion, F. H. Downing, for Mining and Chemical section, E. Freeland; treasurer, W. A. Gordon; corresponding secretary, A. H. Munroe; recording secretary, E. J. Ritchie; curator, E. V. Chambers; 4th year rep., J. McNiven; 3rd year rep., W. Curtis; 2nd year rep., E. Gray; 1st year rep., to be elected in October. Mr. W. D. Black, president of the society, presided.

**Canadian Cement and Concrete Association—Annual Convention.**—The second annual convention and exhibition of the Canadian Cement and Concrete Association will be held at London, Ont., March 29th to April 1st inclusive, in the Princess Rink, Queen's Avenue. The Eastern Canadian Passenger Association has granted the reduced rate of a fare and one-third, and if three hundred or more delegates are in attendance a single fare will be issued.

The exhibition is in charge of Mr. A. M. Hunt, secretary of the Western Fair, London, to whom all communications in regard to the exhibition should be addressed. Particulars as to convention matters may be had from the secretary of the Association, Mr. R. E. W. Hagarty, 662 Euclid Avenue, Toronto.

The exhibition will be opened at 9 a.m. Monday, March 29th, and will close each evening at 10.30. Up to the time of going to press a large portion of the hall has been taken for exhibition purposes and everything points to interesting exhibits. The programme is of a high order as will be seen from the following list of papers and authors:—

1. Richard L. Humphrey, Director of United States Structural Materials Testing Laboratories, Philadelphia. Subject, "Concrete in Europe."
2. Cecil B. Smith, of Smith, Kerry & Chace, Toronto; "Concrete Construction."
3. F. S. Baker, President, Royal Architectural Institute of Canada, "The Use of Cement in Architecture."
4. A. W. Campbell, Deputy Minister of Public Works, Ottawa, "The Engineer and the Finished Work."
5. Professor W. H. Day, Ontario Agricultural College, Guelph, probable subject, "Cement Tiles."
6. Ernest Wilby, Architect, Detroit, Mich., subject undecided.

7. A. W. Connor, of Bowman & Connor, Toronto, "Municipal Concrete Bridges."
8. Percy H. Wilson, Philadelphia, subject undecided.
9. Gustav Kahn, Toronto, "The Commercial Aspect of Reinforced Concrete Work in Canada."
10. C. R. Young, of Barber & Young, Toronto, "An Analysis of Concrete Bridge Failures."
11. H. D. Morrill, Architect, Washington, D.C., "Inexpensive Homes of Concrete."
12. D. C. Raymond, Vice-President, Bishop Construction Company, Montreal and Toronto, "Concrete from the Contractor's Standpoint."
13. Charles Talbot, London, "Highway Bridge Construction."
14. A. G. Larrison, Owen Sound.
15. Philip Wormeley, United States Department of Agriculture, Washington, D.C., "The Uses of Concrete on the Farm."
16. James Pearson, Contractor, Toronto, "Concrete Pavements."
17. C. W. Boynton, Chief Inspecting Engineer, Universal Portland Cement Company, "Concrete Sidewalks."
18. R. A. Plumb, Detroit, Mich., "Waterproofing."
19. J. Augustine Smith, South Bend, Ind., "The Concrete Block in Canada."
20. Peter Gillespie, President, Canadian Cement and Concrete Association, Opening Address.

The special committee on specifications consists of Messrs. Gustave Kahn, Peter Gillespie and R. E. W. Hagarty.

**Central Engineering Club, Toronto.**—At a meeting of the Central Railway and Engineering Club, held last Tuesday evening, Mr. F. A. Carns read two interesting papers on the question of suburban sewage disposal and water supply, prepared by Mr. M. J. Quinn of the National Equipment Company, Toronto. Mr. G. Baldwin, the first vice-president, presided over a large gathering.

**Saskatchewan Land Surveyors' Association.**—At a meeting of the surveyors of the province held in Regina, on Wednesday, March 9th, the Association of Saskatchewan Land Surveyors was organized with the following officers: President, J. L. R. Parsons, Regina; vice-president, William R. Reilly, Regina; secretary-treasurer, M. B. Weekes, Regina; committee, A. C. Garner, Qu'Appelle; H. K. Moberly, Moosomin.

**Edmonton Engineering Society.**—At the February meeting of the Edmonton Engineering Society Mr. Walter J. Francis, C.E., Montreal, gave a very interesting illustrated lecture on the "Quebec Bridge." For over an hour and a half Mr. Francis held the attention of a large audience, and received many compliments. Mr. J. Chalmers, structural engineer, of the Alberta Government, was chairman.

**Nova Scotia Mining Society.**—On Tuesday and Wednesday, March 15 and 16, was held the eighteenth annual meeting of the Mining Society of Nova Scotia, at Halifax, N.S. A banquet was held on Tuesday evening, when the questions of labor and transportation were ably discussed. During the session which was a great success, papers were read by eminent engineers and authorities on questions affecting the profession. The president, Mr. T. J. Brown, presided.

**Nova Scotia Engineers' Society.**—A largely attended meeting of the Nova Scotia Society of Engineers was held last week at the Technical College. A very interesting paper on submarine telegraph cables was read by Mr. McKavanagh, chief electrician of the cable ship "Minia," and Mr. Hamilton, chief engineer of the "Mackay-Bennett," spoke interestingly of the history of Atlantic cables. Before the close of the meeting, Mr. Freeman, of the Halifax Electric Tramway, on behalf of the society, presented an address to the president of the society, Mr. S. Fenn, regretting his departure from Halifax to assume the position of manager of the Direct Cable Company in London. Accompanying the address was a very handsome brass and cut glass smoking set. In replying, Mr. Fenn spoke feelingly of his severance of active membership in the society and hoped it would always honour him by allowing him to remain a member, although residing some thousands of miles away. He spoke impressively to the student members present, pointing out to them the immense educational advantages they enjoyed in having at their doors such a magnificent institution as the Nova Scotia Technical College. He hoped they would take advantage of it to the fullest extent and fit themselves to follow in the footsteps of the many eminent men who had helped to make Nova Scotia the intellectual banner province of the Dominion.

## RAILWAY EARNINGS AND STOCK QUOTATIONS

NAME OF COMPANY	Mileage Operated	Capital in Thousands	Par Value	RAILWAY EARNINGS.				STOCK QUOTATIONS TORONTO						
				Date from	Date to	1910	1909	Price	Price	Price	Sales			
								Mar. 11 '09	Mar. 3 '10	Mar. 10 '10		Week End d Mar. 10		
Canadian Pacific Railway...	10,048	\$150,000	\$100	Jan. 1	Mar. 7	\$13,453,090	\$11,911,000	166	181		75			
Canadian Northern Railway.	3,180	.....	100	"	Mar. 14	1,800,700	1,318,901							
*Grand Trunk Railway ....	3,536	225,000	100	"	Mar. 7	7,267,868	5,798,230	*1st. pref.	103½	3rd pref.	50½	ord'y 20½		
T. & N. O. ....	264.74	(Gov. Road)	100	"	Mar. 7	223,309	143,254							
†Montreal Street Railway...	141.79	18,000	100	"	Mar. 12	747,767	703,038	209	207	225½	224½	228½	228	2435
Toronto Street Railway...	114	8,000	100	"	Jan. 21	298,612	203,513					123½	6	
Halifax Electric .....	13.3	1,400	100	"	Mar. 7	33,138	29,393	111½	125	120	124	123	128	

\* G.T.R. Stock is not listed on Canadian Exchanges. These prices are quoted on the London Stock Exchange.

† Quoted on Montreal Exchange.

### TORONTO STREET RAILWAY.

The Toronto Railway Co. has issued its annual report for the year ended December 31st, 1909. The income account compares as follows:—

	1909	1908	1907	1906
Gross .....	\$3,926,828	\$3,610,274	\$3,511,198	\$3,109,740
Expenses ....	1,995,914	1,889,047	1,893,138	1,646,516
Net .....	\$1,930,914	\$1,721,226	\$1,617,960	\$1,463,224
†Charges ....	838,532	774,028	721,802	647,129
Surplus ..*	\$1,092,382	\$947,198	\$896,158	\$816,095
Dividends ...	560,000	379,514	473,387	460,241
Surplus ...	\$532,382	\$467,684	\$422,771	\$355,854
Contin. acct...	150,000	150,000	125,000	100,000
Net surp..	\$382,382	\$317,684	\$297,771	\$255,854

†Includes payment of city's percentage \$507,827 in 1909 also paving charges, taxes, etc.

\*Equal to 13.65% on \$8,000,000 capital stock comparing 11.84% earned on same stock last year.

### GRAND TRUNK RAILWAY.

The Grand Trunk Railway Company system reports for January:—

Grand Trunk of Canada—January—

	1910	1909	Changes, inc.
Gross receipts .....	£490,200	£400,000	£81,200
Working expenses ...	423,900	358,700	65,200
Net profit .....	£ 66,300	£ 50,300	£16,000
Canada Atlantic—January—			
Gross receipts .....	£ 29,400	£ 23,200	£ 6,200
Working expenses ...	423,900	358,700	65,200
Net profit .....	£ 2,700	* £ 2,100	£ 4,800
Grand Trunk Western—January—			
Gross receipts .....	£ 95,600	£ 85,600	£10,000
Working expenses ....	78,300	68,700	9,600
Net profit .....	£ 17,300	£ 16,900	£ 400
Detroit Grand Haven & Milwaukee—January—			
Gross receipts .....	£ 95,600	£ 85,600	£10,000
Working expenses ...	27,600	20,900	6,700
Net profit .....	£ 5,000	£ 3,900	£ 1,100

\* Deficit.

### CALGARY STREET RAILWAY.

The February statement of the Calgary Street Railway shows a net revenue of almost \$3,000. The cost of power was very high last month on account of the inclemency of the weather. The total cost was \$3,452.50, and the average daily cost \$123.30. During the last seven days of the month

### WEEKLY EARNINGS

NAME OF COMPANY	Week Ending	TRAFFIC RETURNS		
		1910	Previous Week	1909
Canadian Pacific Railway.	Mar. 7	\$1,597,000	\$1,511,000	\$1,380,000
Canadian Northern Railway.	Mar. 14	190,600	195,100	148,900
Grand Trunk Railway .....	Mar. 7	769,177	804,633	624,373
T. & N. O. ....	"	35,954	36,426	26,279
Montreal Street Railway ...	Mar. 12	74,583	74,734	66,141
Toronto Street Railway....	Feb. 7	76,141	74,035	65,843
Halifax Electric. . . . .	Mar. 7	3,609	3,538	3,068
†London Street Railway....	"	18,063	.....	17,454

†For month of January—31 days.

the daily cost of power was reduced to \$120.15 through the use of new brake gears which prevented hugging of the brake shoes. According to the amount of current used private concerns pay all the way from 3c. to 6c. k.w. hour. It is estimated that 2½c. per k.w. hour at the switchboard is equivalent to 3c. distributed. The cost per car mile was 7.53c. during the month.

Some of the figures presented in the monthly statement are as follows:

Passenger earnings .....	\$11 140.05
Miscellaneous .....	213.00
Gross earnings .....	\$11,353.50
Operating expenses, way and structures, etc. ....	\$ 471.74
Maintenance of equipment .....	753.09
Transportation power and operation, etc. ....	3,452.50
Superintendence, wages, car service, supplies, etc. ....	6,813.30
General earnings .....	358.10

### T. AND N. O. EARNINGS.

#### Provincial Railway Did Good Business Last Year.

The earnings of the Temiskaming and Northern Ontario Railway for the year 1909 show a large increase over the previous year. From freight the revenue was \$944,000, as against \$471,000 in 1908, and from passengers \$592,000, as compared with \$366,000 in 1908. The total net earnings, including ore royalties, amounted to \$739,450, compared to \$410,488 in 1908. Of this amount, \$113,301 was from ore royalties, while in 1908 the royalties amounted to \$134,820. The difference is accounted for by the fact that the ore royalties were reduced last year.

In December the gross revenue of the T. and N. O. was \$168,303, while in December, 1908, it was \$117,075. Expenses amounted to \$125,270, and the net earnings thus amounted to \$43,033. This was a slight decrease from \$43,315 in December, 1908, accounted for by the fact that some of the revenue was used to improve the equipment and charged to current expenditure.

# 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.

## TENDERS PENDING.

In addition to those in this issue.

Fuller information may be found in the issues of the Canadian Engineer referred to.

Place and Work.	Tenders close.	Issue of.	Page.
Sault Ste. Marie, Ont., railway....	Apr. 15.	Feb. 25.	48
Saskatoon, Sask., college building ..	Mar. 29.	Mar. 4.	40
Fort William, gas franchise.....	Apr. 1.	Mar. 4.	42
Winnipeg, Man., cast iron .....	Apr. 4.	Mar. 4.	207
Brantford, Ont., sewers .....	Mar. 31.	Mar. 11.	50
Toronto, Ont., electric conduits ..	Mar. 22.	Mar. 11.	233
Winnipeg, Man., pile piers .....	Mar. 24.	Mar. 11.	233
Vancouver, B.C., motor wagons ..	Mar. 22.	Mar. 11.	233
Vancouver, B.C., hose wagons ....	Apr. 21.	Mar. 11.	233
London, Ont. ....	Mar. 19.	Mar. 11.	233

## TENDERS.

**Hull, Que.**—New tenders are invited for the construction of power house extensions to cost (approx.) \$20,000. R. W. Farley, city engineer.

**Joliette, Que.**—Tenders for fittings, Armoury, Joliette, will be received until 5 p.m., Tuesday, March 22nd. Napoleon Tessier, Secretary, Department of Public Works, Ottawa, Ont.

**Quebec, Que.**—Tenders will be received up to 16 o'clock Tuesday, 20th March, for the supply and delivery at the site of the Quebec Bridge, on or before the 1st May next, - good secondhand gasoline launch of not less than 45 feet in length to be used in connection with the construction of the Quebec bridge. L. K. Jones, Secretary, Department of Railways and Canals, Ottawa. (Advertisement in the Canadian Engineer).

**Montreal, Que.**—Tenders will be received up to noon, Friday, 18th March, for certain alterations in the Council Chamber and Ante-Rooms, City Hall, consisting of (1) Repairs to the walls and ceilings, and Painting and Decorating; (2) Certain Wood-work; (3) Brass Railing. Specifications obtainable from Mr. R. Drouin, Superintendent, City Hall Building. L. O. David, City Clerk.

**Courtland, Ont.**—Tenders will be received up till Saturday, April 2nd, for the erection of a new Town Hall. Also for the construction of the old Town Hall. D. W. White, Clerk.

**Islington, Ont.**—Tenders will be received by the Council of the Township of Etobicoke, up to 12 noon, Monday, 4th April, for the construction and completion of Pipe Sewers and appurtenances for a system of sewers at New Toronto. Plans and specifications may be seen at the office of the Engineers, Murray & McAllister, Continental Life Building, Toronto. J. A. L. Macpherson, Clerk.

**Leamington, Ont.**—Tenders for Post Office, Customs and Inland Revenue Buildings, will be received until Monday, April 4th. S. O. Roach, Leamington. T. A. Hastings, Postal Station "F," Toronto. Napoleon Tessier, Secretary, Department of Public Works, Ottawa, have plans, etc.

**London, Ont.**—Tenders for the following supplies will be received up to Thursday, March 24th: Cement sidewalks, cement curb and gutter, lumber, hardware, iron castings, gravel, broken stone, corner irons, delivering broken stone sewer pipe and cement, concrete pipe. A. O. Graydon, City Engineer.

**Mimico, Ont.**—Tenders will be received up to noon, Monday, April 4th, for the construction and completion of a pipe sewer and appurtenances to connect with the New Toronto sewer system. J. A. L. Macpherson, Engineer in charge, Islington. Chester Ferrier, Superintendent Victoria Industrial School.

**Ottawa, Ont.**—Tenders will be received up to March 31, for the supply of 500,000 tons of Bituminous Coal for the Intercolonial Railway and 13,500 tons of Bituminous Coal

for the Prince Edward Island Railway. Specifications can be obtained from the undersigned, and from the General Storekeeper at Moncton, N.B. Louis Lavoie, Purchasing Agent, Department of Railways and Canals.

**Ottawa, Ont.**—Tenders will be received at the office of the Commissioners of the Transcontinental Railway, until 12 o'clock noon, 23rd March, for 24,733 gross tons of 80-lb. steel rails (open hearth or Bessemer) at the option of the Commissioners, and the necessary rail fastenings, in strict accordance with the specifications of the Commissioners. Gordon Grant, Chief Engineer, Ottawa, Ont., will give full information in regard to deliveries, etc. P. E. Ryan, Secretary.

**Peterboro', Ont.**—Tenders will be received until noon, Friday, 8th April, for the installation of a steam heating system to heat the Court House and County Buildings. Ed. M. Elliott, County Clerk.

**Toronto, Ont.**—The Board of Education will shortly invite tenders for the construction of a school at Balmy Beach. James Simpson, Chairman.

**Toronto, Ont.**—Tenders will be received until noon Wednesday, 30th March, for the dredging required in the harbor of Toronto for this season. C. W. Postlethwaite, Harbor Master, 508 Board of Trade Building.

**Toronto, Ont.**—Tenders will be received until Tuesday, April 19th, for the construction of the following sewerage system:—1. Section No. 8, flattened shape, 1,216 linear feet, 7 feet 10 inches x 10 feet. 2. Section No. 7, circular shape, 3,246 linear feet, 9 feet 6 inches diameter. 3. Section No. 1, circular shape, 2,072 linear feet, 9 feet 3 inches diameter, and 1,336 linear feet, 9 feet diameter. Total length Section No. 1, 3,408 linear feet. 4. Section No. 2, circular, 2,993 linear feet, 8 feet 9 inches diameter. 5. Don Syphon, crossing under River Don. Specifications may be obtained from Main Drainage Department, City Engineer's Office. G. R. Geary, Mayor, Chairman Board of Control. (Further particulars advertised in The Canadian Engineer).

**Hamilton, Ont.**—Tenders addressed to John I. McLaren, Chairman Board of Control, will be received up to 5 o'clock p.m., Tuesday, March 22nd for the several works required in fitting up a lavatory at the City House of Refuge. Stewart & Witton, architects, Hamilton Provident and Loan Building.

**Hamilton, Ont.**—Tenders will be received up till noon, Wednesday, March 23rd, for the various trades, including tiling, plumbing and heating fittings, etc., in the erection of Registry Office. Stewart McPhie, 701 Bank of Hamilton Building. J. W. Jardine, County Clerk.

**Kingston, Ont.**—Proposals will be received until noon Monday, 21st March, for furnishing the materials and labor of all kinds necessary for laying a steel intake pipe. A. K. Kirkpatrick, Engineer, Rockwood Hospital.

**Toronto, Ont.**—Tenders for hardware for branch library, corner of Gerrard street and Broadview avenue, will be received for up to noon, Tuesday, March 20th. Plans, etc., may be seen and obtainable from R. McCallum, City Architect. E. S. Caswell, Secretary-treasurer, Public Library.

**Toronto, Ont.**—Tenders will be received up to 12 noon, Tuesday, March 22nd, for the building of two vaults and the supply, fitting and installation of office fixtures, in the offices of the Toronto Hydro-Electric System, City Hall. Plans and specifications may be seen at the offices of the Property Department. G. R. Geary, K.C., (Mayor) Chairman Board of Control.

**Toronto, Ont.**—Tenders will be received till noon, Tuesday, March 22nd, for the erection of a five-storey fireproof building on the southeast corner of King and Bay Streets, Toronto, for the Union Bank. Darling & Pearson, Architects, 2 Leader Lane.

**Toronto, Ont.**—Tenders will be invited shortly for the construction of a new building required in connection with the improved fire alarm system. Fire Chief Thompson.

**Winnipeg, Man.**—Tenders are requested for the construction of station at Minnedosa. Plans, etc., can be seen

at the office of the Res. Engineer, Brandon and the Division Engineer, Winnipeg. Tenders must be delivered at the office of Frank Lee, Division Engineer, Canadian Pacific Railway, Winnipeg, by 12 o'clock, March 28th.

**Winnipeg, Man.**—Tenders will be received by the Commissioners of the Transcontinental Railway, at Ottawa, Ontario, until 12 noon, 12th April, for (1) Machines and tools; (2) Leather belting; (3) Shafting, hangers, steel frame work, etc.; (4) Miscellaneous equipment, industrial track and lockers; (5) Motors; (6) Furnaces and forges; (7) Cranes; (8) Air compressors; (9) Grey iron foundry equipment and brass foundry equipment; required for the equipment of the locomotive and other shops of the Commissioners of the Transcontinental Railway at Springfield, east of Winnipeg. Gordon Grant, Chief Engineer, Ottawa, Ont.; S. R. Poulin, District Engineer, St. Boniface, Man.; P. E. Ryan, secretary, Ottawa.

**Winnipeg, Man.**—Tenders will be received up to 6 p.m., Tuesday, March 22nd, for the erection of a brick church building at the corner of Broadway and Furby streets, for the Trustee Board of Young Methodist church. James Chisholm & Son, Architects, 310 Enderton Building, Cor. Portage and Hargrave Street.

**Winnipeg, Man.**—Tenders will be received till noon, March 19th, for the construction of a pile bridge and approaches over Muckle's Creek. Plans and specifications may be seen at Department of Public Works, Winnipeg. J. M. Muckle, Clandeboye, P.O.

**Winnipeg, Man.**—Tenders will be received up to 30th March, at Minitonas, for a ninety-foot Steel Pratt Truss bridge, piles, caps and shore spans will be built by the municipality. The bridge is to be built on the Woody River, about three-quarters of a mile south of the Bowsman station, C.N.R. Plans may be seen at the Department of Public Works, Winnipeg, or at office of E. Widmeyer, Secretary-treasurer, Minitonas.

**Winnipeg, Man.**—Tenders will be received for the heating, ventilating and plumbing required in a building for the Great West Life Assurance Co., until Saturday noon, March 19th. John D. Atchison, Architect, Bank of Toronto Building.

**Lethbridge, Alta.**—Tenders will be received until 6 p.m., Monday, 21st March, for the building of certain additions to the "Chinook Club," Lethbridge. William T. Williams, Architect.

**Calgary, Alta.**—Tenders will be received until April 1st for completing construction of western section, irrigation block, Alberta—timber construction amounting to one and a quarter million feet B.M. J. S. Dennis, Assistant to 2nd Vice-President, C.P.R. Irrigation Department, Calgary. (Advertisement in the Canadian Engineer.)

**Calgary, Alta.**—Works Board have recommended that they be authorized to call for tenders and let contracts for supply of copper wire up to 50,000 pounds in order to get enough wire on hand to maintain the supply for the department and on account of the rapidly rising market, the rate being now about 18 cents per pound here.

**North Battleford, Sask.**—Tenders will be received until 8 p.m., Tuesday, April 19th, for the following works:—

Contract "A"—Pipe laying, waterworks and sewers.

Contract "D"—Cast iron water pipes.

Contract "E"—Fire hydrants, valves, etc.

Contract "L"—Concrete reservoir.

Contract "X"—Sewage disposal works.

Plans and specifications may be seen at the office of the Chief Engineer, Winnipeg and Toronto, and at the Town Hall, North Battleford. J. A. Foley, Esq., Mayor, North Battleford, Sask. Willis Chipman, C.E., Chief Engineer.

**Regina, Sask.**—Tenders are being called for by Storey & Van Egmond, architects, for the new store and apartment building to be erected on Eleventh Avenue for G. S. Wood. Tenders close March 22nd. The building will cost in the neighborhood of \$35,000.

**Moose Jaw, Sask.**—Tenders will be received until Monday, April 11th, for constructing 33,300 sq. yards of pavement, 13,500 lin. feet combined curb and gutter, and 116,500 sq. feet concrete sidewalk. Angus Smith, City Engineer. (Advertisement in the Canadian Engineer.)

**Battleford, Sask.**—Tenders will be received up to noon 31st March, for the construction of buildings on the Indian Reserves: Thunderchild's Reserve, Battleford Agency, Moomin's Reserve, Battleford Agency, Beady's Reserve, Duck Lake Agency. Plans may be seen at the following offices: Indian Agents at Battleford and Duck Lake, and the offices of Dominion Lands at Prince Albert and Battleford,

and can be had upon application to J. D. McLean, Secretary, Department of Indian Affairs, Ottawa, Ont.

**Victoria, B.C.**—Tenders will be received up to 31st March, for the erection and completion of a large one-room frame school-building in the Ymir Electoral District. Plans, etc., may be seen at the office of the Government Agent at Nelson, Revelstoke; Secretary of the School Board, J. N. Pennock, Arrow Park, and at the Department of Public Works, Victoria. F. C. Gamble, Public Works Engineer.

**Regina, Sask.**—According to a letter received by city council, the C.P.R. have invited tenders for the construction of a subway here. J. E. Schmitzer, Assistant Chief Engineer, C.P.R., Winnipeg.

**Vancouver, B.C.**—Tenders are invited for 1910 supply of cement. W. A. Clement, City Engineer.

**Vancouver, B.C.**—Tenders will shortly be invited for approximately eighty tons of castings required by the water-works department. S. Madison, Superintendent.

**Victoria, B.C.**—Tenders are invited for 200 pillars and lamp attachments, required in connection with street lighting in G. H. Bryson, acting city engineer. (Closing date not specified.)

**Victoria, B.C.**—Tenders are invited and will be received up to 8 p.m., 24th March, for the cutting and delivery of 40,000 ties. H. E. Knobel, Engineer, Portland Canal Short Line Railway, Empress Hotel.

**Victoria, B.C.**—Tenders will be received until March 29, for the erection of a school building at Tappen Siding. F. C. Gamble, Public Works Engineer.

**Stamford, Conn.**—Charles T. Main, Mill Engineer and Architect, Boston, Mass., has completed plans for three new buildings for the Yale & Towne Mfg. Company of Stamford. Bids asked for plans cover building No. 6: 57 ft. by 57 ft., six floors—3 floors reinforced concrete, 3 floors slow burning mill construction, saw tooth roof; building No. 12: 153 x 50—six floors—slow burning mill construction, all beams of wood, saw tooth roof; building No. 12½: 60 x 50—six floors—reinforced concrete throughout, except roof of slow burning mill construction. All these buildings have walls of brick, 1st floor on ground level and every floor waterproofed. Tar and gravel roofs.

## CONTRACTS AWARDED.

**Sydney, N.S.**—Following tenders were received for the construction of a new fire station:—

	Brick Construction.	Reinforced Concrete.	Monolithic Blocks.
1. ....	\$13,400	\$13,300	\$12,500
2. ....	14,755	15,560	14,150
3. ....	14,200	12,800	13,250
4. ....	14,500	14,150	13,600

1. Rhodes, Curry & Company, Amherst, N.S.

2. Chappell Bros. & Company, Ltd.

3. F. L. Dixon.

4. A. Gillis.

No. 1, for brick construction, was accepted.

**Montreal, Que.**—For 4,700 tons of soft steam coal required for the Low Level Pumping Station, F. H. Phelan was awarded a contract at \$4.10 a ton. Other tenders were: Hall & Company, \$4.55 per ton; Intercolonial Coal Company, \$4.25; Andrew Baile, \$4.28.

**Montreal, Que.**—Tremblay & Francoeur have been awarded a contract for heating, ventilation and power supply in connection with the new technical school building at \$73,642. Other tenders were:—Latreille & Latreille, \$94,995; General Fire Extinguisher Co., \$90,026; James Ballantyne, \$82,000; Evans, Almiralle Co., \$81,772; W. J. McGuire & Co., \$76,797; The Garth Co., \$74,750. The work covered in this contract consists of the installation of 540 horsepower boilers, divided into three units, comprising 2 Babcock and Wilcox boilers and one Belleville boiler. These will generate electricity for the dynamos and motor. The exhaust steam will be used for heating by means of two steam turbine pumps. A complete system of ventilation is also provided for including connections with the main building, the lecture rooms, and class rooms. The ventilating system will be operated by means of hot air. Tenders have also been received for switchboard and power wiring. The contract for this work has not yet been let. The plans and specifications for the new building were prepared by J. S. Archibald, of Saxe & Archibald.

**Kingston, Ont.**—The Waterous Engine Works Company of Brantford, Ont., have just supplied this city with a new fire tank with a capacity of six thousand gallons a minute.

**St. Thomas, Ont.**—G. A. Ponsford has been given a contract for building Dodd's bridge in Yarmouth county. Tenders for a 50-foot reinforced concrete structure, were:—

G. A. Ponsford .....	\$2,336
Spoyne & Ramey .....	2,525
Williams & Walker .....	2,975
Jos. Vincent .....	3,475
C. C. Stafford .....	4,391

**Gatham, Ont.**—Park Brothers have been awarded a contract for waterworks supplies, and the following tenders were received for the installation of a pump at the local waterworks:—

McKeough & Trotter .....	\$1,260.00
McKeough & Trotter .....	1,388.00
Smart-Turner Company .....	1,295.00
Canada Foundry Company .....	1,390.00
John McDougall Caledonian Iron Works Company .....	2,507.00
Park Brothers .....	1,402.50
Canadian Buffalo Forge Company—freight and duty extra .....	\$33.50
Gardener Governor Company—duty extra .....	1,100.00

Contract for pump was not awarded.

**Hamilton, Ont.**—The Forwell Foundry Company, of Berlin, got contracts for waterworks extension boxes, at \$1.35 and \$1.75.

**Hamilton, Ont.**—Contracts for the new general police station, aggregating \$20,875, were awarded as follows:—Masonry, Richard Tope, \$12,000; carpentering, Drake & Drake, \$3,831; painting, Stamp & Son, \$600; plastering, John Clapham & Son, \$1,098; plumbing, gas and heating, Drake & Avery, \$2,921; roofing, Thomas Irwin & Son, \$425. The tenders for the electric wiring, steel work and flooring were left to a committee to figure out. They will not aggregate more than \$2,000.

**Kingston, Ont.**—The County Good Roads Committee will purchase from the Sawyer-Massey Company, a rock crusher at \$1,100, and a spreader waggon. They deferred the purchase of a steam roller.

**Kingston, Ont.**—The Waterworks Committee will recommend that tenders for supplies be awarded as follows:—Selby & Youlden, hydrants, etc.; Francis Tracy, steel drills, picks, etc.; Chadwick Bros., service cocks; Canada Foundry Company, valves, etc.; Gartshore, Thompson Pipe and Foundry Company, cast iron piping; Queen City Oil Company, oil; Simmons Bros., block tin, waste, etc.; W. B. Dalton & Sons, fire clay, shovels, etc.; McKelvey & Birch, lead piping, galvanized piping, fittings, etc.

**Port Colborne, Ont.**—The J. H. Tromanhauser Construction Company, Temple Building, Toronto, have been awarded the contract for construction of the Hedley-Shaw mill here. Contract for excavation have been given to J. L. Weller, of St. Catharines.

**Toronto, Ont.**—The Board of Education have accepted the following tenders for the Kimberley Avenue school eight-room edition:—Masonry, G. T. Grafton, \$14,500; carpentry, Frank Armstrong, \$7,414; plastering, George White, \$2,216; painting, J. R. Robinson, \$1,120; plumbing, Keith & Fitzsimons, \$1,500; steam heating, Keith & Fitzsimons, \$2,650; structural steel, W. H. Salter, \$4,325; cement work, W. H. Salter, \$2,115; ventilation, Johnston Temperature Company, \$566; wiring, Hall & Dollery, \$61; tiling, A. Gardner & Co., \$2,870; steel for tiling, W. H. Salter, \$2,115. The total cost of the addition is \$36,212, as far as the tenders accepted are concerned. The estimated cost was \$35,000, and the addition results from several changes or additions to the original plans by the board.

**Midland, Ont.**—The Wm. Hamilton Company of Peterboro' have been awarded a contract by the Simcoe Railway and Power Company, to supply penstocks, standpipes and five hydraulic turbines in connection with power development at Big Chute, on the Severn River.

**Toronto, Ont.**—City Engineer Rust, in a report to the Board of Control, recommended the acceptance of the tender of the Canadian-British Insulated, Limited, of Montreal, for the cable for the electric power plant. They will supply it for \$48,024.50. The next lowest tender was \$48,188.85.

**Winnipeg, Man.**—The city engineer recently reported on tenders for railroad asphalt plants, recommending that of F. D. Cummer & Son, capacity 1,800 square yards per day, at \$16,500. In the opinion of the engineer the Cummer plant, considering capacity, was best suited to the city's

needs. The recommendation of the engineer was concurred in by the board and the plant will be purchased. Other tenderers were Alloway & Champion, six tenders on various types of plants; Bitulithic and Contracting Co., and H. P. Pennock & Co. The prices ranged from \$15,700 to \$23,100, but the lowest tender was for a plant with a capacity of only 1,000 yards daily.

**Winnipeg, Man.**—Tenders recently invited for the erection of a five-wire fence and gates along both sides of the city's transmission line right-of-way between here and the Brokenhead River, were as follows:—

	Per mile.
Manitoba Bridge & Iron Works, Winnipeg....	\$105
W. J. Holmes .....	170
P. H. Andrews .....	289

These are merely for the erection of the fence all the materials having been bought by the power engineers. It is proposed to fence in all the settled portions on the transmission line which it is estimated will amount to about twenty-four miles. This, at the price of the lowest tender, would amount to some twenty-five thousand dollars, which is much in excess of the estimates. The contract has not yet been awarded.

**Winnipeg, Man.**—Carter, Halls & Aldinger, Winnipeg, have been awarded the contract for a six-storey office building to be erected in Calgary for Leeson & Linehan, at a cost of \$125,000. The structure will be of the latest fire-proof construction, reinforced concrete, brick and stone being used.

**Winnipeg, Man.**—The Algoma Steel Bridge Company, through their Winnipeg office, have secured the following contracts for highway bridges:—Swan River, Man., 2 spans, 75 and 56 feet; Municipality of Shellmouth, Man., 2 72-foot spans, and another near Russell, Man., of 2 90-foot spans.

**Calgary, Alta.**—Waterworks Commissioners have recommended the following tenders for waterworks supplies for 1910: Canadian Brass Co., Galt, Ont.—Brass work for house services, lump sum, \$2,357, f.o.b., Calgary. J. Robertson Co., Winnipeg—Pipe lead, \$5.50 per 100 lbs., f.o.b., Calgary; pig lead, \$4.62 per 100 lbs., f.o.b., Calgary. Gurney Standard Metal Co., Calgary, Oakum, \$3.75 per 100 lbs., f.o.b., Calgary. Crane & Ordway—Galvanized iron pipe, bulk sum \$3,175, f.o.b., Calgary. Calgary Ironworks, Calgary—Valve boxes, \$4 per 100 lbs. Canadian Foundry Co., Toronto—Crane posts, \$54.10; specials, \$3.20 per 100 lbs. Bissett & Loucks, Winnipeg—Valves \$2,089.30 lump sum; f.o.b., Calgary. Calgary Iron Works, Calgary—Hydrants, \$50 all sizes, without crane attachment. Made to sample. Union Iron Works, Calgary—Hydrants, 8 ft., \$49.50; 8 ft. 6 in., \$50; 9 ft. \$51.50 without crane attachment. With crane attachment \$5 extra. Made to sample. Evans, Coleman, Evans, Vancouver—Cast iron pipe.

**Calgary, Alta.**—Works Board have recommended that 200 meters of various sizes be contracted for with the Canadian General Electric Company, Toronto, for the coming year; also that 200 five ampere meters or over be contracted for with the Northwest Electric Company, and necessary poly-phase meters.

**Edmonton, Alta.**—The contract for the new Molsons Bank building to be erected on Jasper Avenue has been awarded to J. Dunlop, at a figure close to the fifty thousand dollar mark. The building will be a three-storey structure, fire-proof, of concrete and stone. H. A. Magon, Architect.

**Moose Jaw, Sask.**—Contract for a 20 h.p. motor with 11 x 10 pulley, bed plate, and dustproof bearings suitable for operating a gyratory rock crusher, given to Allis-Chalmers-Bullock, Ltd., at \$310.

**Victoria, B.C.**—The contract for the new G.T.P. wharf in this city has been awarded to C. J. Johnston & Company, Vancouver and Seattle. The intention of the company is to have the work on the wharf rushed with all expedition so as to be ready for the arrival of the new steamers now being completed in the Old Country.

**New Westminster, B.C.**—W. A. Gilley has been awarded a contract for pile foundation for three and a half miles of railway to be constructed by the Fraser River Lumber company at Comox. The company owns seven hundred acres of limits in that vicinity, and it is now in order to facilitate shipments that the line is being built. The railway will necessitate about 3,500 piles and 3,000,000 feet of lumber.

**Vancouver, B.C.**—City Engineer Clement will report on tenders, as follows:—Clearing and rough-grading streets in wards four and six. In the former section T. R. Nickson was the only bidder, tendering for the work at the price of

\$1 per lineal foot. In ward six the work was divided in three sections, M. P. Cotton bidding 95 cents per foot for the entire work, T. R. Nickson's bid being from 95 to 97 cents, and Mr. S. Becker bidding on one section at \$1.24.

For the construction of two city scows the following offers were made: Easner & Steeves, \$6,800; J. Crane, \$7,825; M. J. Mayhew, \$6,875; M. P. Cotton, \$7,800; Patterson & Matthews, \$6,600; Wallace Shipyards, \$6,450.

For the year's supply of gravel two offers were submitted based on delivery f.o.b. on city scows on the inlet or False Creek, the Terminal Gravel Company quoting 75 cents per cubic yard, and Mr. M. I. Mayhew asking \$1. The Terminal Gravel Company added an offer for delivery to various districts at prices ranging from \$2 to \$3 per yard. Offers were also presented for gravel on city scows at Port Kells for 65 cents and at Port Mellon at 75 cents.

For the paving of Howe Street, the city engineer will probably recommend acceptance of the Hossam Company's tenders.

**Victoria, B.C.**—The Michigan Puget Sound Lumber Company will be given an order for one and a half million blocks required for wood pavements.

## RAILWAYS.

**Halifax, N.S.**—Board of Works has recommended to council the acceptance of a proposition made by J. W. Crosby, superintendent, Halifax Electric Tramways Company, in respect to double-tracking.

**St. John, N.B.**—A party of English engineers, reported to have been brought out by J. A. Taylor, of New York, the contractor for the construction of the Hudson Bay Railway, have left for Prince Albert, Sask., and it is said survey work will commence immediately. R. Stewart Reid, the chief medical inspector, has arrived from Scotland.

**Montreal, P.Q.**—At their next meeting, council will consider extensions proposed by the Montreal Street Railway Company.

**Sherbrooke, Que.**—Among the provisions of the street railway by-law which is to be submitted to the ratepayers on March 21st, are:—(1) Exclusive street railway rights during life of contract. (2) Use of streets without charge for 20 years. (3) Exemption from taxation on plant and property actually used for street railway purposes for 20 years, if the apply to the Legislature for power to grant this exemption.

**Brockville, Ont.**—G.T.R. are said to be considering the construction of engine shops and large freight yards here.

**Ottawa, Ont.**—J. D. Fraser, secretary of the Ottawa Electric Co., is considering plans prepared by City Engineer, N. J. Ker, for extensions estimated to cost from \$75,000 to \$105,000.

**Ottawa Ont.**—The first sod on Little Nation River has been turned. The railway will run from Papineauville towards the northerly part of Labelle county, connecting with the Canadian Northern at Arundel. The company has also petitioned to connect with the Grand Trunk Pacific.

**Ottawa, Ont.**—City Engineer N. J. Ker, has completed the preparation of estimates for the extension of the street car lines to Ottawa East, fixing the cost by either of the proposed routes at between \$75,000 and \$80,000.

**Toronto, Ont.**—Legislature refused the Monarch Electric Railway permission to enter the City of Toronto, the chief point of objection being the mode of entrance.

**Niagara Falls, Ont.**—An act of incorporation of the Niagara Falls, Welland and Dunnville Electric Railway. The capital stock of the company is \$200,000. Bonds may be issued for \$30,000 a mile. The provisional directors are J. Carlton Gardner, civil engineer, Niagara Falls; George Arnold, F. E. Misener, G. H. Bugar and H. A. Rose. The head office will be located here. The company may build a single or double track. They can run in the following townships—Stamford, Thorold, Crowland, Town of Welland, Humberstone, Wainfleet, Moulton and Sherbrooke. A branch line may be run through Pelham and Thorold.

**Cuelph, Ont.**—The Ontario Government have granted permission to the People's Railway for the proposed extensions to Wellesley and New Dundee and construction work will commence early this spring. A. N. Warfield, chief engineer.

**Welland, Ontario.**—C. J. Laughlin, of Hartford, Conn. has asked the council for a twenty-year street railway franchise.

**Winnipeg, Man.**—It is reported in railway circles here, that the Chicago, Milwaukee and St. Paul Railway Company, is seeking an entrance to Winnipeg. They have secured a right of way through North Dakota to Neche on the boundary line, sixty-five miles from Winnipeg.

**Brandon, Man.**—City is applying to Provincial Government for power to purchase a transfer railway, connecting the three railways now operated in the city, and to transfer the same to a company to operate.—Mayor Adolph.

**Regina, Sask.**—Mayor R. H. Williams has gone to Winnipeg to make arrangements for a union station here, and for the construction of a street railway. Eight miles of track will be laid this year.

**Calgary, Alberta.**—J. A. McCullough has made a proposition to the city council respecting the construction of an electric railway from Calgary to Chestermere Lake. No decision has been reached.

**Edmonton, Alta.**—According to Mr. E. A. James, manager of the Great Waterways Railway, 200 miles of the track from Edmonton north to Lake La Biche, will be finished this month. The company proposes to extend the lines next year to Fort McMurray, a point 350 miles north of Edmonton, where connection will be made with internal waterways.

**Chilliwack, B.C.**—A party of Canadian Northern surveyors are at work on a second survey through this valley. The party are now working westward from Rosedale.

**Nelson, B. C.**—The Nelson Street Railway Company have ordered cars from the Ottawa Car Company, of Ottawa, while rails for extensions will be supplied by Evans, Coleman & Evans of Vancouver, B.C. Contracts for building new lines will be let at an early date.

**Vancouver, B.C.**—The Great Northern line from Orville, Wash., to Penticton, B.C., has been located. Forty miles of road may be built this year.

**Vancouver, B.C.**—The British Columbia Electric Railway are considering extensions on Burrard and Richards Streets.—General Manager Sperling.

**Victoria, B.C.**—Work has been commenced on the docks in the inner harbor here for the Grand Trunk Pacific.

**Vancouver, B.C.**—Track-laying out of Prince Rupert will probably be started about April 1st, according to W. C. C. Mehan, general superintendent of the mountain division of the Grand Trunk Pacific railway. Mr. Mehan will make his permanent headquarters at Prince Rupert. Until a few weeks ago he filled the position of superintendent of the prairie division of the new transcontinental line. His headquarters were at Melville and his jurisdiction extended from Winnipeg to Wolfe creek, west of Edmonton. His new territory will extend from Wolfe creek to Prince Rupert, and, of course, will include the mountain divisions. Mr. Mehan, who will organize the company's operating department and also direct the forthcoming track-laying operations, stated that he expected to have the line finished and in operation to a point 100 miles inland before the end of the summer. Operations may be delayed, owing to bridge construction.

**Vancouver, B.C.**—C. A. Hannington, who is in charge of the Canadian Northern survey in Northern British Columbia, has succeeded in locating a line from the entire distance between Tete Jaune Cache and the Yellow Head Pass at the summit of the Rockies. He is now on the way out and is engaged revising a portion of last summer's survey near Cranberry Lake, in the summit between the North Thompson and Fraser rivers. The Canadian Northern now has a line located from New Westminster to Yellowhead Pass, 450 miles.

## LIGHT, HEAT AND POWER.

**Sherbrooke, Que.**—The street railway promoters have decided upon the Lower Magog River power if the by-law now before the people is passed and street railway development undertaken. An option has been secured, and it is estimated that the purchase price and subsequent development will represent close to \$200,000. The idea is to establish one dam above the present street railway power dam, and by a penstock to conduct the water to a power house to be established farther down the river. It is said a fifty-foot head may be obtained, providing between two and three thousand horse-power.

**Brockville, Ont.**—Light Commission (John Webster, chairman) have asked council to submit to ratepayers a \$50,000 by-law for extensions to gas and electric light plants.

**Kingston, Ont.**—Members of our Light and Power Department are visiting other towns with a view to obtaining information as to the advisability of making gas from coal instead of oil.

**Regina, Sask.**—Some extensions will be made to the electric light plant here. A report just issued shows that after paying all interest and providing for a sinking fund, last year's working of the city's plant showed a net surplus of \$27,844. It is proposed to use this surplus on additional equipment.

**SEWERS, SEWAGE AND WATERWORKS.**

**Montreal, Que.**—McGill and Laval medical experts, in a report on the recent typhoid epidemic, agreed that the cause was impure water, and have recommended a filtration project.

**London, Ont.**—Included in the estimates of Water Commissioners are \$10,000 for main extension and \$10,000 for meters and hydrants.

**New Toronto, Ont.**—Until April 4, the Township of Etobicoke invites tenders for constructing sewage disposal works plans for which were prepared by Murray & MacAllister, Continental Life Building, Toronto.

**Regina, Sask.**—Mayor R. H. Williams expects to receive shortly the report of the consulting engineers who are preparing plans for the sewerage scheme to cost \$350,000, which will be under full construction this year.

**Medicine Hat, Alta.**—Mayor Milne recently intimated that he was considering a sewerage scheme with a view to an early solution of the problem.

**Cumberland, B.C.**—Provincial Government engineer is said to be preparing plans for a sewerage scheme here.

**Victoria, B.C.**—G. H. Bryson, acting engineer, in a report on the Smith's Hill Reservoir, advised that it be lined with brick, the walls and floor being previously treated with asphalt, at an approximate cost of \$10,000.

**FINANCING PUBLIC WORKS.**

The following municipalities recently sold debentures:—

**Davidson, Sask.**, \$17,000.

**Walkerville, Ont.**, \$17,562.

**Rochester Township, Ont.**, \$5,300.

**North Sydney, C.B.**—Council will seek power to borrow \$18,000 for streets, water and sewers.

**North Sydney, N.S.**—Council have decided to borrow \$18,000 for improvements to streets, water service and sewerage system and for the erection of a new town hall.

**Woodstock, N.B.**—Council will apply for power to borrow \$10,000 for building permanent streets.

**Quebec, Que.**—The taxpayers of St. Romauld have voted to grant \$15,000 bonus to the St. Lawrence Car Works.

**Westmount, P.Q.**—By-laws authorizing a loan of \$550,000 for municipal improvements, including roadways, sewers and new buildings, have passed the first reading in council.

**Brantford, Ont.**—\$270,359, for local improvements.

**Brockville, Ont.**—Ratepayers have passed a by-law to raise \$16,000 for rebuilding town bridges. Barber & Young, Toronto, are consulting engineers.

**Brantford, Ont.**—Tenders are invited for the purchase of debentures amounting to \$270,359. A. K. Bunnell, treasurer.

**Bloomfield, Ont.**—A by-law has been carried by the ratepayers to issue \$3,000 road improvement debentures.

**Fort Erie, Ont.**—A by-law for \$50,000 waterworks debentures was carried on Tuesday.

**Nassagaweya, Ont.**—Ratepayers will vote on a \$10,000 drainage by-law.

**Rodney, Ont.**—Council passed a \$2,500 new town hall by-law.

**Sterling, Ont.**—The ratepayers will vote on March 21st on a by-law to issue \$10,000 20-year 5 per cent. electric light debentures. G. G. Thrasher, clerk.

**St. Thomas, Ont.**—Tenders will be received up to Thursday, March 31st, for the undermentioned debentures: \$42,000 Hydro-Electric; \$5,752.08 local improvement; \$11,052.81 local improvement. W. B. Doherty, clerk.

**Welland, Ont.**—Tenders will be received up to April 7th for debentures amounting to \$115,242. J. Hamilton Burgar, town treasurer.

**Assiniboia, Man.**—Ratepayers will, on 2nd April, vote on a \$40,000 school by-law.

**St. Anne, Man.**—The ratepayers have passed a by-law to issue \$20,000 5 per cent. 20-year debentures for roads, bridges, etc. J. A. Lacerte, clerk.

**Davidson, Sask.**—A by-law has been passed to issue \$17,000 town hall and fire hall debentures.

**Wetaskiwin, Alta.**—Two by-laws were submitted to the ratepayers of Wetaskiwin, one for the raising of \$40,000 to complete the waterworks and sewerage system and the other for the raising of \$5,000 for the extension of the electric light plant. Both carried.

**Saskatoon, Sask.**—Citizens voted down a by-law to provide \$110,000 for hospital extension.

**Prince Albert, Sask.**—Council is considering a \$15,000 by-law for fire hall construction.

**Saskatoon, Sask.**—By-law to provide \$110,000 for hospital extension was defeated.

**Wetaskiwin, Alta.**—Two by-laws, one for raising \$40,000 to complete the waterworks and sewerage system and the other for the raising of \$5,000 for the extension of the electric light plant were carried.

**Mission, B.C.**—Will borrow \$25,000 to improve roads.

**North Vancouver, B.C.**—Ratepayers will vote on March 23 on a by to raise \$25,000 for construction of roads and pavements and another for \$17,200 for schools. Thomas Shepherd, city clerk.

**Point Grey, B.C.**, \$325,000, for the construction of roads and sidewalks.

**Vancouver, B.C.**—Ratepayers will vote on a money by-law for the construction of sewers.

**DEPARTMENT OF THE INTERIOR SURVEYORS EMPLOYED UNDER CONTRACT ON 1910 SURVEYS.**

Name.	Address.	Location of Survey.
Molloy, J.,	Sprague, Man.;	Eastern Manitoba.
Tyrrell, J. W.,	Hughson St. S.	Hamilton, Ont.; Fisher [River, Northern Manitoba.
Teasdale, C. M.,	Concord, Ont.;	W. of Hudson Bay Jct., [C.N.R.
Morrier, J. E.,	Ottawa, Ont.;	W. of Hudson Bay Jct., C.N.R.
Montgomery, R. H.,	Prince Albert, Sask.;	Northwest of [Prince Albert.
Watt, G. H.,	65 First Ave.,	Ottawa, Ont.;
		Northeast of [Battleford.
Warren, Jas.,	Walkerton, Ont.;	Northeast of Battleford.
Roy, G. P.,	28 Lachevrotiere St.,	Quebec, P.Q.;
		North of [Battleford.
Stewart, W. M.,	Saskatoon, Sask.;	North of Battleford.
Stock, J. J.,	455 Cooper St.,	Ottawa, Ont.;
		North of Battleford.
Fawcett, A.,	Gravenhurst, Ont.;	N. E. of Onion Lake.
Holcroft, H. S.,	108 St. Vincent St.,	Toronto, Ont.;
		N. E. [of Onion Lake.
Baker, J. C.,	Vermilion, Alta.;	North of Onion Lake.
Hopkins, M. W.,	Edmonton, Alta.;	West of Cold Lake.
Kimpe, M.,	Edmonton, Alta.;	West of Edmonton.
Waddell, W. H.,	Edmonton, Alta.;	S. E. of Lac la Biche.
Chilver, C. A.,	Walkerville, Ont.;	West of Lac la Biche.
Waldron, J.,	Moose Jaw, Sask.;	N. E. of Athabaska Landing.
Cote, J. L.,	Edmonton, Alta.;	North of Athabaska Landing.
Stewart, L. D. N.,	Collingwood, Ont.;	E. of Athabaska [Landing.
Mitchell, B. J.,	Edmonton, Alta.;	S. E. of Athabaska Land- [ing.
Orde, L. R.,	Edmonton, Alta.;	South of Athabaska Landing.
Seymour, H. L.,	Edmonton, Alta.;	S. E. of Athabaska Land- [ing.
Davies, T. A.,	Edmonton, Alta.;	S. of Athabaska Landing.
Steele, I. J.,	18 Rideau Terrace,	Ottawa, Ont.;
		W. of Atha- [baska Landing.
Knight, R. H.,	Edmonton, Alta.;	W. of Athabaska Landing.
Fairchild, C. C.,	Brantford, Ont.;	W. of Athabaska Landing.
Findlay, A.,	215 McIntyre Block,	Winnipeg, Man.;
		W. of [Athabaska Landing.
McGrandle, H.,	Wetaskiwin, Alta.;	W. of Edmonton.
Cautley, R. H.,	Edmonton, Alta.;	W. of Edmonton.
Heathcott, R. V.,	Edmonton, Alta.;	W. of Edmonton.
Smith, J. H.,	Edmonton, Alta.;	W. of Lesser Slave Lake.
McFarlane, W. G.,	Edmonton, Alta.;	Peace River District.



## CURRENT NEWS.

**Montreal, Que.**—The organization of the Quebec Railway, Light, Heat and Power Company, which is the merger of the leading public utility companies of the City of Quebec and district, was successfully completed at a meeting held on Saturday, when directors were elected and these officers appointed: Rodolphe Forget, M.P., Montreal, president; Lorne C. Webster, Quebec, vice-president; Neuville Belleau, Quebec, chairman of the executive. Hon. Robert Mackay, Hon. J. P. B. Casgrain, Montreal; Hon. E. B. Garneau, L.C., Hon. C. E. Dubord, L.C., and Hon. L. P. Pelletier, K. C., Quebec; J. N. Greenshields, K.C., Paul Galibert, J. W. McConnell, A. H. Sims, S. H. Ewing, and W. G. Ross, Montreal, and W. A. Marsh, Quebec.

**London, Ont.**—Council have decided to advertise for an engineer capable of handling all the municipal engineering departments, at a salary of about \$5,000 a year.

**Ottawa, Ont.**—The Dominion Cement Company, with a capital of five million dollars, and headquarters at Montreal, heads the list of the numerous companies whose incorporation is announced in this week's Canada Gazette. The company will manufacture, buy, and deal in cement, and its by-products. The incorporators are Messrs. Edwin C. Eckel, engineer, of Washington, D.C.; G. W. McDougall, K.C.; Lawrence MacFarlane, and C. A. Pope, advocates, and James Waterston, student, of Montreal.

**Peterboro, Ont.**—Granolithic walks will be built on many streets here this season, according to a notice of the city intention, recently published. E. A. Hay, city engineer.

**Brandon, Man.**—A special meeting of the City Council has been called to discuss the question of City Engineer Speakman's resignation. Members of the council are in favor of making the engineer a tempting offer if he will stay.

**Calgary, Alta.**—All that the city is awaiting now in order that the work on the First Street East subway may be commenced is the verified plans from the C.P.R. of the portion of the work which the railway company will have to carry out. Just as soon as the plans are received, the city commissioners will call for tenders for the excavation work. The entire job will be done by contract. J. T. Childs, city engineer.

## PERSONAL.

**Mr. W. V. Taylor, C.E.**, of Montreal, has been appointed to the staff of the Harbour Commissioners, Quebec.

**Dr. Klotz** has been appointed assistant chief astronomer by the Dominion Government.

**Mr. J. J. McArthur, D.L.S.**, has been appointed, by the Dominion Government, assistant superintendent of Alaskan boundary surveys.

**Mr. C. A. Biggar** has been appointed assistant superintendent of geodetic surveys, by the Dominion Government.

**Mr. George A. Little** has been appointed city street superintendent of Ottawa, Ont. Mr. Little is an ex-alderman, and has had much experience in municipal matters.

**Mr. Mason H. Baker**, of St. Thomas, Ont., has been appointed assistant engineer by that municipality, and it is expected that he will take full charge of the office when Mr. James A. Bell resigns.

Mr. George Y. Chown, who recently tendered his resignation to the senate of Queen's university, Kingston, as registrar of that institution, has reconsidered his action and will continue in the office.

**Mr. R. E. McArthur, C.E.**, who for the past eight years has been connected with the C.P.R. Engineering Department, latterly at Winnipeg, has severed his connection with that company and has opened an office in Lethbridge, Alberta, as a consulting engineer.

**Prentiss Vise Company** will remove about May 1st to Hardware Building, 106-110 Lafayette Street, corner Walker Street, New York, having found the accommodation at 44 Barclay Street, where they were located for upwards of twenty years, insufficient for their increasing business. A. Macfarlane & Company, Coristine Building, Montreal, are the Canadian sales agents.

**Mr. W. E. Woodhouse**, C.P.R. master mechanic, Calgary, was this week appointed superintendent of shops at Winnipeg, to succeed Mr. S. J. Hungerford, who resigned to become master of motive power on the C.N.R., last week. Mr. Wood-

house is a well-known western railroad man. He was born in November 1872, and entered the service of the Canadian Pacific Railway in June 1891, as fitter at Donald, February 22, 1902. He was appointed to the position of locomotive foreman at Smelter Junction, May 9, 1906, he was appointed to the position of district master-mechanic of the fourth district, central division. He was appointed master mechanic at Calgary, October 15, 1906.

**Professor A. P. Coleman** has been recommended for election as a Fellow of the Royal Society for the year. The formal election by the society will take place in May. Professor Coleman is the sixth fellow of the society to be chosen from Canada. From the University of Toronto Professors A. B. Macallum and F. G. Brodie have already been similarly honoured; from McGill University, Professors F. D. Adams, Wilson and Adami; and from Ottawa University, Dr. Robert Bell. Professor Coleman was the only one chosen this year from without the United Kingdom. He was also the recipient of the Murchison Medal given by the London Geological Society last month for special service in geological research. He is a Canadian by birth and since his graduation from Victoria University in 1876 has given himself up completely to scientific pursuits. After graduation he spent several years in Europe, where he undertook numerous geological expeditions in the various mountainous countries. On his return to Canada he was appointed Professor of Geology and Natural History in Victoria University and filled the position until 1891, when he was chosen to fill the chair of Assaying and Metallurgy in the School of Practical Science. He still retains this position in the Faculty of Applied Science of the University of Toronto.

**Mr. R. E. Speakman**, present city engineer of Brandon, Manitoba, has been appointed city engineer of Victoria, B.C. A member of the Canadian Society of Civil Engineers, and the American Society of Civil Engineers, he is an Englishman by birth and received his training as a civil engineer in England where he had charge of extensive works. He came to Canada in 1892, his first work in this country being the construction of a sewage disposal and waterworks system in Brandon. In 1895 he moved to Toronto where he engaged in general municipal engineering practice until 1903, and during that time designed and carried out several large engineering works in the following Ontario towns: Prescott, waterworks, sewage and electric light plants; Oshawa, waterworks and sewerage system; Collingwood, sewage system; Stayner, gravity waterworks system; Port Hope, waterworks system; Hanover, waterworks system; North Toronto, waterworks system; Whitby, waterworks and electric light systems, Toronto, coal handling plants and electric light and power systems for the Elias Rogers Coal Company and the Conger Coal Company. Mr. Speakman also designed and constructed municipal engineering works at Ailsa Craig, Park Hill, Stirling, Cargill, Southampton, Merriton, etc. In 1903, Mr. Speakman was engaged as city engineer at St. Catharines, Ont., which position he held until 1906, when he resigned to accept a like position at Calgary. In these two cities he had extensive experience in municipal work of a similar nature to that which he will superintend in Victoria. In Brandon he designed a new street railway and central heating system.

## MISCELLANEOUS.

**Montreal, Que.**—Among the improvements that will be made by the Harbour Commissioners in connection with the six million dollar loan, which has practically been secured from the Dominion Government, are the erection of a two million bushel elevator, track raising work, purchase of a new dredge, for which tenders were invited some time ago, and the construction of new sheds on Victoria Pier.

**Kenora, Ont.**—The Royal Canadian Flour Mills Company has been organized here with a capital of \$1,000,000. They will erect a large plant.

**London, Ont.**—George White & Sons will erect in East London a concrete building to cost \$40,000.

**Port Arthur, Ont.**—Proposed reinforced concrete bridge across Current River will be erected shortly. J. Antonisen, city engineer, will invite tenders.

**Toronto, Ont.**—Included in the estimates of the Provincial Treasurer are \$100,000 for new Government House, \$200,000 for new wing of Parliament building, \$67,400 for ad-

ditions to Osgoode Hall, \$50,000 for new Provincial prison at Guelph, \$15,000 for Dog Lake storage dams, \$60,000 for trunk roads, \$118,000 for colonization roads, \$200,000 for the Hydro-Electric transmission line and \$100,000 for the wing of the Parliament buildings that was destroyed by fire.

**Toronto, Ont.**—The plans for the Northwest High School were submitted by Superintendent Bishop, and were adopted at a recent meeting of the Board of Education.

**Brockville, Ont.**—The Fire and Water Committee have recommended the purchase of much new equipment including a combined hose and chemical engine wagon, a steam fire engine of 800 gals. a minute capacity, etc. Mayor Paterson.

**Kingston, Ont.**—Wm. Neelands, architect, estimates that it will cost \$14,000 to remodel the north wing of the municipal buildings and instal steam heating. Property Committee (Ald. Graham, chairman) will ask for \$7,600 for small steam heating installation.

**Kingston, Ont.**—The Township Council of the Front of Yonge, Leeds County, has entered into a contract with the Hon. Clifford Sifton to erect a new thirty-two foot span steel bridge across Jones' Creek, near Mr. Sifton's summer residence. The township is to pay \$2,000 towards the new structure, and assume control of it on completion.

**Niagara Falls, Ont.**—Plans for the new armoury are here. The building will be 175 by 110 feet, of red brick and white stone, at an expenditure of \$70,000.

**Ottawa, Ont.**—Hon. Mr. Fielding has given notice of a resolution in the Commons authorizing a loan of an additional six million dollars for the Montreal Harbor Commission, to defray the cost of contemplated improvements.

**Ottawa, Ont.**—Supplementary estimates for the current year amounting to \$2,302,117 were tabled this week by Hon. W. S. Fielding. The votes include: Repairing Sault Ste. Marie Canal break, \$135,000; Port Arthur and Fort William harbour improvements, \$425,000; Tiffin harbour improvements, \$23,000; Victoria Harbour improvements, \$36,000; Guelph public buildings, \$1,776; improvement of northern channel in Georgian Bay at Little Current, \$41,000; dredging approaches to Sault Ste. Marie wharfs, \$14,600; dredging in Maritime Provinces, \$245,000.

**Morrisburg, Ont.**—The town council has granted the assignees of the Canadian Sheet Steel Corporation permission to make alterations in the power plant according to plans submitted by Henry Holgate, consulting engineer of Montreal, whereby the efficiency of the plant would be greatly increased, thus permitting the Sheet Steel company to put on another mill.

**Port Arthur, Ont.**—The Canadian Stewart Company has secured a contract for building a drydock here at a figure in the neighbourhood of one million dollars.

**Winnipeg, Man.**—Plans have been drawn by Samuel Hooper, Provincial Architect, for proposed alterations to the Manitoba Government buildings to cost \$400,000.

**Winnipeg, Man.**—The Winnipeg Land and Mortgage Company will erect a two-storey office building here this spring to cost \$15,000. H. B. Rugh is the architect.

**Edmonton, Alta.**—P. Burns & Company, of Calgary, will erect a half million dollar packing plant here this season.

**Winnipeg, Man.**—A \$3,205 bridge will be erected over Omand Creek by the city engineer's department.

**Winnipeg, Man.**—S. Hinacal will erect a cold storage plant on Higgins Avenue, at an approximate cost of \$80,000.

**Calgary, Alta.**—Parks Board purposes spending much money on improvements. J. T. Macdonald, chairman.

**Lethbridge, Alta.**—Council have decided to make a number of local improvements, including extensions to water mains and construction of sidewalks. C. M. Arnold, city engineer.

**Edmonton, Alta.**—At a recent meeting of the council, the public works estimates for the current year, totalling nearly a million and a half, were adopted. This amount is to be expended in an extension of Edmonton's municipally-owned utilities. Walter J. Francis, M. Can. Soc. C.E., of Montreal, who was consulted, has left for the East.

**Moose Jaw, Sask.**—A \$100,000 three-storey college building will be built here shortly. Plans are being prepared for two similar buildings to cost the same amount.

**Moose Jaw, Sask.**—S. P. Porter, deputy minister of railways and telephones has announced that the department will spend \$125,000 in the city this year. A completely new telephone system will be installed and a handsome exchange building erected, a site for which has already been purchased.

The department has also decided to complete the long distance line to Outlook this year, a distance of 125 miles, and possibly one from Moose Jaw to Swift Current.

**Vancouver, B.C.**—Fire department estimates for maintenance amount to \$327,000. The chief recommends purchasing two automobiles.

**Vancouver, B.C.**—There is a persistent rumor that the Mackenzie-Mann interests will establish a smelter on the British Columbia coast, perhaps at Esquimalt.

## ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

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

9734—February 28—Approving plans of proposed new station of Canada Atlantic Railway at Henrysburg, Que.

9735—February 28—Authorizing the C.P.R. to construct a siding into the premises of the Canada Furniture Company at Woodstock, Ontario.

9736—February 28—Authorizing the C.P.R. to construct a branch line of railway to the premises of the Colonial Wood Products Company, Limited, Thorold, Ontario.

9737—February 28—Authorizing the Bell Telephone Company to erect its wires across the tracks of the G.T.R. ¼ mile south of G.T.R. Station, Richmond, Que.

9738—February 28—Authorizing the Manitoba Government Telephones to erect wires across the C.P.R. tracks, 3½ miles north-east of Bradwardine, Manitoba.

9739—February 28—Authorizing the Bell Telephone Company to erect wires across the tracks of the G.T.R. at the public crossing just north of the station, Laprairie, Quebec.

9740—February 28—Authorizing the Montreal & Southern Counties Railway Company to carry electric wires across G.T.R. tracks on Common Street, and at what is known as the "Three Diamond Crossing," near Riverside Street, Montreal, Que.

9741—February 28—Authorizing the city of Montreal, Quebec, to lay its sewers across the track of the C.P.R. at Papineau Avenue, Montreal, Quebec.

9742—March 2—Authorizing the G.T.R. to construct spurs to premises of Doolittle and Wilcox, Dundas, Ontario.

9743 to 9750 Inc.—March 1—Ordering the Railway Companies concerned in the crossings at the following points be relieved for the present from providing further protection at the crossings named, it appearing from an inspection made by the Board's Engineer and Operating Department, and from plans furnished, that the views at the crossings are excellent from both directions; that the crossing signboards are properly placed, and that there are whistling posts on the railway.—1. G.T.R. first highway west of Kingscourt Junction, Tp. Warwick, Co. Lambton, Ont. 2. M.C.R. highway one mile east of Taylor Station, Co. Elgin, Ont. 3. M.C.R. second crossing east of Attercliffe Station, County Haldimand, Ont. 4. M.C.R. first highway west of Buxton Station, County Kent, Ont. 5. M.C.R. second highway east of West Lorne Station, County Elgin, Ont. 6. M.C.R. highway just east of Charing Cross Station, County Kent, Ont. 7. M.C.R. highway 4 miles west of Ridgetown Station, County Kent, Ont. 8. M.C.R. highway west of Dufferin Station, County Haldimand, Ont.

9751—February 28—Authorizing C.P.R. to carry party of mining students of McGill University at a special rate of \$40 per capita, for the trip from Montreal, Que., to Rossland, Phoenix, Greenwood, B.C., and return, or at a rate of \$50 per capita from the said city of Montreal, Que., to Vancouver, B.C., and return, including side trips to Rossland, Phoenix, and Greenwood, B.C.

9752—February 21—Approving plan of revised crossing of St. Michel Road at mile 5.05, submitted by C.N.Q. Railway Company, and rescinding Order No. 8746, dated November 10th, 1909, in so far as it approves of crossing as shown on the plan on file with the Board under file No. 12204.

9753—February 21—Directing the M.C.R. to construct an interchange track between its railway and the Pere Marquette Railroad for the interchange of traffic between their companies; the Leamington Canning Company, of Leamington, Ont., to furnish the necessary lands therefor. Plans to be approved by the Board's Engineer.

9754—March 2—Authorizing the C.N.O.R. to construct its tracks across the public road between the Counties of Ontario and Durham at Station 1862.87.

9755—February 26—Directing that the crossing of the highway by the M.C.R. just west of Comber Station, County Essex, Ont., be protected by gates to be installed not later than 1st May, 1910, and operated between the hours of 7 a.m., and 7 p.m., daily.

9756 and 9757—March 2—Authorizing the Rural Municipality of Argyle to carry its wires across the C.N.R. at a point 3½ miles and a point 5½ miles east of Neelin Station, Man.

9758—February 26—Authorizing the Hydro-Electric Power Commission to carry its electric transmission line across the Lake Erie & Detroit River Railway at Lot 3, Con. R.S.E.R., Tp. Yarmouth, Ont.

9759—February 17—Directing that the future user by the C.P.R. and G.T.R., of the Lachine Canal Bank Branch tracks and sidings shall be subject to the terms and conditions set forth in agreement, varied as follows:—(a) Cost of operation to be divided equally between said companies; (b) cost of maintenance be divided between said companies on a mileage basis. Order to take effect as of March 15th, 1910.

9760—February 23—Modifying Order No. 3245 in so far as it applies to the operation by the Boston & Maine Railroad in Canada, so as to permit the use by the Boston & Maine upon engines with extension smoke boxes of perforated spark plates made from steel plate, No. 8 gage, with staggered perforations 3-16" x 1¼"; width of bridges between sides of perforations ¼", and between ends of perforations 3-16", in the place and stead of No. 10 Birmingham Wire Gage Netting Mesh, as provided in said Order.

9761—March 1—Dismissing application of the National Transcontinental Railway, under Secs. 227 and 256, for leave to cross the terminal tracks and spur tracks controlled and operated by the C.N.R. in Winnipeg, by overhead crossings.

9762 and 9763—March 2—Authorizing Seymour Power & Electric Company to carry its wires across the wires of the North American Telegraph Company at Campbellford, Ont., and across the tracks of the Bay of Quinte Railway at Stoco, Ont.

9764 to 9773 Inc.—March 2—Authorizing the Manitoba Government Telephones to carry its telephone wires across the track of the C.N.R. at ten different points in the Province of Manitoba.

9774—March 4—Authorizing the G.T.R. to construct and operate a cross-over track on Ferguson Avenue, north of Barton Street, Hamilton, Ont.

9775—March 3—Authorizing C.P.R. to construct two industrial spurs at Medicine Hat, Alberta, for the Alberta Clay Products Company, Limited.

9776—March 4—Amending Order No. 9047, December 24th, 1909, by striking out the words "Twenty-third Street," and substituting "Twenty-fourth Street."

9777—March 3—Directing that all Telegraph Companies carrying on business in Canada file with the Board, on or before April 1st, 1910, copies of all forms used in transmitting and receiving messages.

9778—March 1—Directing (1) that the C.P.R. widen the cut on the west side of the railway 25 feet, if its present right-of-way permits at the crossing between Concessions 10 and 11, Tp. of Medonte; work to be completed by 1st October, 1910. (2) That the proposed road on the west side of the railway at Lot 10, Concession 10, between mileage 163.06 and mileage 162.85, connecting the original road with the present crossing at mileage 162.95, be graded for use as a public highway, and an electric bell be installed by the Railway Company by 1st May, 1910. (3) That the Railway Company excavate the bank on the east side of the track at the crossing between Concessions 9 and 10, to the limit of its right-of-way at the crossing; such excavation to run out to nothing about 200 feet north of crossing. (4) That the Railway Company take down the snake fence on the east side of the track and the south side of the highway at the crossing between Lots 5 and 6, Concession 9, and replace same with a wire fence for a distance of 100 feet from the track. (5) That at the crossing at Hobart Station both approaches be widened and properly gravelled for use as a highway. (6) That the approaches to the crossing between Concessions 7 and 8 be properly gravelled, and (7) that the crossings between Concessions 6 and 7, and 2 and 3 stand for future consideration by the Board; these crossings all being in the Township of Medonte.

9779—March 3—Directing that the crossing by the M.C.R. of the highway just west of Ruscombe Station, Ont., be protected by a standard automatic electric bell.

9780—March 3—Dismissing application of the Parish of St. Jacques des Piles for an Order directing the C.P.R. to construct a suitable crossing where the said railway intersects the street "I" in the village of St. Jacques des Piles, Que.

9781—March 3—Authorizing the Vancouver, Victoria & Eastern Railway and Navigation Company, and the C.P.R., to operate their trains over crossing on line of railway from Sapperton to the Fraser River Lumber Company's mills at New Westminster, B.C., without first being brought to a stop.

9782—February 21—Directing the Bell Telephone Company to allow and provide a connection of its telephone system with the West Williams Telephone Company, at Parkhill, Ont., upon such terms as to compensation as may be agreed upon between the parties.

9783—March 5—Approving location of Esquimalt & Nanaimo Railway from mile 0 at Parksville on the Wellington to Alberni Branch of its railway to mile 34.79, at Union Bay, District of Nelson, on Vancouver Island, B.C.

9784—March 5—Authorizing the C.N.O.R. to divert the public road between Lots 20 and 21, Concession 4, Township of Whitty, Ont.

9785 to 9789 Inc.—March 4—Authorizing the Bell Telephone Company to carry its wires across the tracks of the G.T.R. at five different points in the Province of Ontario.

9790—March 7—Authorizing the Essex Terminal Railway Company to construct a second track across MacDougall Street, an existing highway in the Township of Sandwich West, and a spur track south of said second track across the said MacDougall Street.

9791—March 4—Authorizing the C.P.R. to construct its railway across certain highways between Concessions 3 and 4, in Lot 6, Concession 3, between Concessions 2 and 3, and between Concessions 1 and 2, Township of Etobicoke.

9792—March 7—Authorizing the C.P.R. to use and operate 24 bridges on its Mountain, Edmonton, Shuswap, Medicine Hat and Laggan Sections.

9793—March 4—Authorizing the C.P.R. to construct and operate an extension to an industrial spur to the premises of the Brandon Brewing Company, Brandon, Man.

9794—March 3—Directing the M.C.R. to install a standard automatic electric bell at some point between Medora and Thomas Street crossings, west of Essex Station, Ontario.

9795—March 7—Authorizing the C.P.R. to use and operate the subways at First Street West and Second Street East, in Calgary, Alberta.

9796—March 7—Authorizing the C.P.R. to use and operate a bridge over Ferry Slip in the city of Vancouver, B.C.

9797—March 7—Authorizing the C.P.R. to use and operate the bridges, Nos. 8.2, and 8.3, on the McLeod Section of its line of railway.

9798—March 7—Authorizing the C.P.R. to use and operate four bridges on the Swift Current Section of its line of railway.

9799—March 8—Authorizing the G.T.R. to construct and operate a passing track across the public road allowance between Lots 5 and 6, in the concession fronting on the Great Catarqui River, Township of Kingston, Ont., and being the first road crossing east of the Montreal Street Subway at Kingston, Ont.

9800—March 8—Authorizing the Goderich Elevator and Transit Company, Limited, to construct a bridge for foot passengers across the track of the G.T.R. to the track of the C.P.R., immediately west of the Goderich Elevator.

9801—March 8—Directing the V. V. & E. Railway and Navigation Company to grade and put in good order before the 1st of July, 1910, within the limits of its right-of-way, the approaches to the undergrade crossing on the farm of Eric Anderson, District of New Westminster, B.C.

9802—March 1—Directing the G.T.R. to protect the crossing at Main Street, Ottawa East, by gates, to be operated by a day and a night watchman, the gates to be installed not later than the 1st of June, 1910.

9803—March 7—Authorizing the Essex Terminal Railway to construct a second track across Dougall Road, Township of Sandwich West, Ontario.

9804—March 7—Authorizing the C.P.R. to use and operate bridge at mileage 31.2, on the Cascade Section of its line of railway.

9805—March 1—Directing the G.T.R. to install an electric bell at Main Street crossing, village of Carp, Ontario.

9806—March 8—Rescinding Order of the Board No. 9157, dated January 5th, 1910, which authorizes the C.N.O.R. to cross and divert the lines and tracks of the G.T.R. near Brighton, Ontario.

9807—March 8—Amending Order No. 9736, dated February 28th, 1910, which authorizes the construction of a branch line of railway in the town of Thorold, Ont., by inserting after the word "and" in the fifth line of the operative part of the said Order the words "of the Municipal Council of the Town of Thorold."

9808—March 8—Authorizing the Seymour Power & Electric Company, Limited, to carry its transmission line across the C.P.R. at Sulphide, Ontario.

9809—March 1—Directing that the bridge-tender at present employed day and night by the G.T.R. at Echo River, Ottawa East, shall act as flagman at that crossing.

9810—March 8—Directing that the crossing of the highway by the New York Central and Hudson River Railway at rail level, near the village of Beauharnois, Quebec, be protected by an electric bell to be installed and thereafter maintained at the expense of the Railway Company.

9811—March 8—Approving plans and specifications of a bridge over Moisson Creek, Township of Rochester, G.T.R.

9812—March 8—Approving plans and specifications of a bridge over Duck Creek, Township of Rochester, G.T.R.

9813—March 9—Directing that the rate to be charged by the express companies for the carriage of daily newspapers from Winnipeg, shall be the same as charged by the Dominion Express Company in Eastern Canada, namely, ¼ cent per pound on the aggregate weight per month, to points reached by the said companies within three hundred miles of Winnipeg, exclusive of wagon service.

9814-15—March 9—Authorizing the Manitoba Government Telephones to carry its wires across tracks of the Brandon, Saskatchewan & Hudson's Bay Railway Company at two points.

9816-17—March 9—Authorizing the Farmers' Rural Telephone Company to carry its wires across the tracks of the C.P.R. at two points, in the Province of British Columbia.

9818 to 9826 Inc.—March 9—Authorizing the Hamilton Cataract Power, Light and Traction Company, Limited, to erect its power and light wires across the lines of the Bell Telephone Company at ten points, and the Hamilton, Grimsby and Beamsville Electric Railway Company, at one point.

9829—March 9—Directing the protection of crossing at Merry Street, Magog, Quebec, by the C.P.R., to be protected by an automatic electric bell; the town to do certain filling in at the approach to the bridge, and erect fences from the railing at the northwest angle of the bridge in a westerly direction along the top of the bank, to a point fifteen feet west of the western boundary of Merry Street, produced.

9830—February 7—Authorizing the Dominion Light, Heat and Power Company to carry its light and power lines underneath the track of the Montreal Terminal Railway Company at the intersection of Aird Street, Maisonneuve, Quebec.

9831 to 9838 Inc.—March 7—Ordering the Railway Companies concerned in the crossings at the following points, be relieved for the present from providing further protection at the crossings named, it appearing from an inspection made by the Board's Engineer and Operating Department, and from plans furnished, that the views at the crossings are excellent from both directions; that the crossing signboards are properly placed, and that there are whistling posts on the railway:—1. G.T.R. crossing south of Milton Station, Ont.; 2. G.T.R. crossing highway one and one-half miles north of Maple, Ont.; 3. G.T.R. crossing highway, 1st highway east of York Station, Ont.; 4. G.T.R. crossing highway between Concessions 4 and 5, Township of Tecumseh; 5. M.C.R. crossing second highway west of Pelton, Ontario; 6. G.T.R. crossing three-quarters of a mile south of Beeton Station, Ontario; 7. G.T.R. crossing first highway south of Bradford, Ontario; 8. G.T.R. crossing first highway west of Manilla Junction, Ontario.

9839 to 9847 Inc.—March 10—Authorizing the Esquimalt and Nanaimo Railway Company to construct its tracks across nine highways on its Comox Extension, from mile 0 at Parksville, to mile 34.79 at Union Bay, B.C.

## MARKET CONDITIONS.

Following the quotations of the various articles listed in the markets will be found in brackets numbers, thus (10). These numbers refer to the list number of advertisers on page 3 of this issue and will assist the reader to quickly find the name and address of a firm handling any particular article. Buyers not able to secure articles from these firms at the prices mentioned will confer a favor by letting us know.

Montreal, March 17th, 1910.

The feature of the market for pig-iron, in the United States, is the weaker feeling in the eastern district. There has also been evidence of some further declines even in the north and south. Sales, however, continue large, and the output is very heavy. It seems to be the opinion of people on the local market that the production of pig-iron in the United States is now at a high record, so that the weakness is to some extent explained. During the past week, the Westinghouse Electrical Manufacturing Company has purchased 15,000 tons on a basis of \$16.75 per ton, delivered

at Alleghany and \$16.50 at Cleveland,—this for No. 2 Foundry. In steel-making iron, there has not been enough trade in the east to establish a market; and no important contracts are recorded in the central west since the purchase, by the Cambria and Lackawana Steel Companies, at about \$17.75, Valley furnaces, for Bessemer. Scrap has been in good demand, interest being centred in the railway offerings.

Notwithstanding the dullness in pig-iron, the railways are now placing contracts for a large tonnage of bridge material, rails, and structural material generally. The largest business in prospect, however, is for cars and locomotives. It is claimed that orders amounting to 500,000 tons of steel are in sight, exclusive of the requirements for wheels and axles, so that the requirements of the railways during the present season would give promise of being especially large.

There is no marked change in the English situation, but the tendency is towards a greater volume of business, with prices on the up-turn. Notwithstanding the unsatisfactory reports from the United States and the quieter tone on the continent, the different Scotch makers of pig-iron are very confident as to the future. They are asking higher prices for second ores, coke, etc., prevents a likelihood of any lowering of prices, and, with a reasonably good business, prices are almost sure to strengthen still further. Good orders are held for shipbuilding, and it is confidently expected that other large contracts will shortly be undertaken. Should these expectations be fulfilled, it will naturally assist steel-makers and have a decided influence on the pig-iron market. Scotch makers are well supplied with orders and are holding firm at recent advances. They are showing no anxiety to sell, believing that better market conditions will prevail later on in the year.

Local business continues good. It is believed that considerably larger orders for pig-iron have been placed this year than is customary at this early date. Many of the orders cover the requirements of customers for the bulk of the year. Canadian furnaces are behind on their orders and are not anxious sellers for any delivery. Consequently, consumers are looking to outside sources for supplies. These are being secured principally from England and Scotland. Importers are expecting many thousands of tons of pig-iron to arrive at the opening of navigation.

Dealers in shapes, bar iron and steel, sheets and plates are now confidently predicting an advance within a short time. They say that it has long been delayed but that the delay is now almost at an end, inasmuch as the material is costing more to produce and there is little or no surplus remaining. Meantime, prices hold steady as follows:—

**Antimony.**—The market is steady at 8 to 8½c. (111).

**Bar Iron and Steel.**—The market promises to advance shortly. Bar iron, \$1.85 per 100 pounds; best refined horseshoe, \$2.10; forged iron, \$2; mild steel, \$1.85; sleigh shoe steel, \$1.85 for 1 x ¾-base; tire steel, \$1.00 for 1 x ¾-base; toe calk steel, \$2.35; machine steel, iron finish, \$1.90; imported, \$2.20 (111, 110)

**Building Paper.**—Tar paper, 7, 10, or 16 ounces, \$1.80 per 100 pounds; felt paper, \$2.75 per 100 pounds; tar sheathing, 40c. per roll of 400 square feet; dry sheathing, No. 1, 30 to 40c. per roll of 400 square feet; tarred fibre, 55c. per roll; dry fibre, 45c. (See Roofing; also Tar and Pitch). (164).

**Cement.**—Canadian cement is quotable, as follows, in car lots, f.o.b. Montreal:—\$1.30 to \$1.40 per 350-lb. bbl., in 4 cotton bags, adding 10c. for each bag. Good bags re-purchased at 10c. each. Paper bags cost 2½ cents extra, or 10c. per bbl. weight. (26, 164).

**Chain.**—Prices are as follows per 100 lbs.:—¼-inch, \$4.90; 5-16-inch, \$4.40; ¾-inch, \$3.70; 7-16-inch, \$3.50; ½-inch, \$3.25; 9-16-inch, \$3.20; ¾-inch, \$3.15; 1-inch, \$3.10; ¾-inch, \$3.05; 1-inch, \$3.05.

**Coal and Coke.**—Anthracite, egg, stove or chestnut coal, \$6.75 per ton, net; furnace coal, \$6.50, net. Bituminous or soft coal: Run of mine, Nova Scotia coal, carload lots, basis, Montreal, \$3.85 to \$4 per ton; cannel coal, \$9 per ton; coke, single ton, \$5; large lots, special rates, approximately \$4 f.o.b. cars, Montreal

**Copper.**—Prices are strong at 14 to 14½c.

**Explosives and Accessories.**—Dynamite, 50-lb. cases, 40 per cent. proof, 15c. in single case lots, Montreal. Blasting powder, 25-lb. kegs, \$2.25 per keg. Special quotations on large lots of dynamite and powder. Detonator caps, case lots, containing 10,000, 75c. per 100; broken lots, \$1; electric blasting apparatus:—Batteries, 1 to 10 holes, \$15; 1 to 20 holes, \$25; 1 to 30 holes, \$35; 1 to 40 holes, \$50. Wire, leading, 1c. per foot; connecting, 50c. per lb. Fuses, platinum, single strength, per 100 fuses:—4-ft. wires, \$3; 6-ft. wires, \$3.54; 8-ft. wires, \$4.08; 10-ft. wires, \$5.

**Galvanized Iron.**—The market is steady. Prices, basis, 28-gauge, are:—Queen's Head, \$4.10; Colborne Crown, \$3.85; Apollo, 10¼ oz., \$4.05. Add 25c. to above figures for less than case lots; 26-gauge is 25c. less than 28-gauge, American 28-gauge and English 26 are equivalents, as are American 10¼ oz., and English 28-gauge. (111).

**Galvanized Pipe.**—(See Pipe, Wrought and Galvanized).

**Iron.**—The outlook is strong. The following prices are for carload quantities and over, ex-store, Montreal, prompt delivery; No. 1 Summerlee, \$21.50 to \$22 per ton; selected Summerlee, \$21 to \$21.50; soft Summerlee, \$20.50 to \$21; Clarence, \$19.50 to \$20; Carron, No. 1, \$21.50 to \$22, and Carron special, \$21 to \$21.50. (111).

**Laths.**—See Lumber, etc.

**Lead.**—Prices are about steady at \$3.55 to \$3.65.

**Lead Wool.**—\$10.50 per hundred, \$200 per ton, f.o.b., factory.

**Lumber, Etc.**—Prices on lumber are for car lots, to contractors, at mill points, carrying a freight of \$1.50. Red pine, mill culls out, \$18 to \$22 per 1,000 feet; white pine, mill culls, \$16 to \$17. Spruce, 1-in. by 4-in. and up, \$15 to \$17 per 1,000 ft.; mill culls, \$12 to \$14. Hemlock, log run, culls out, \$13 to \$15. Railway Ties; Standard Railway Ties, hemlock or cedar, 35 to 45c. each, on a sc. rate to Montreal. Telegraph Poles: Seven-inch top, cedar poles, 25-ft. poles, \$1.35 to \$1.50 each; 30-ft., \$1.75 to \$2; 35-ft., \$2.75 to \$3.25 each, at manufacturers' points, with ex. freight rate to Montreal. Laths: Quotations per 1,000 laths, at points carrying 1.50 freight rate to Montreal, \$2 to \$3. Shingles: Cedar shingles, same conditions as laths, X, \$1.50; XX, 2.50; XXX, \$3. (112)

**Nails.**—Demand for nails is better and prices are firmer, \$2.40 per keg for cut, and \$2.35 for wire, base prices. Wire roofing nails, 5c. lb.

**Paints.**—Roof, barn and fence paint, 90c. per gallon; girder, bridge and structural paint for steel or iron—shop or field—\$1.20 per gallon, in barrels; liquid red lead in gallon cans, \$1.75 per gallon.

**Pipe, Cast Iron.**—The market shows a steady tone although demand is on the dull side. Prices are firm, and approximately as follows:—\$32 for 6 and 8-inch pipe and larger; \$33 for 3-inch and 4-inch at the foundry.

Pipe, specials, \$3 per 100 pounds. Gas pipe is quoted at about \$1 more than the above. (74, 188).

**Pipe.—Wrought and Galvanized.**—Demand is about the same, and the tone is firm, though prices are steady, moderate-sized lots being: ¼-inch, \$5.50 with 63 per cent. off for black, and 48 per cent. off for galvanized; ¾-inch, \$5.50, with 59 per cent. off for black and 44 per cent. off for galvanized; 1½-inch, \$8.50, with 69 per cent. off for black, and 59 per cent. off for galvanized. The discount on the following is 7½ per cent. off for black, and 6½ per cent. off for galvanized; ¼-inch, \$11.50; 1-inch, \$16.50; 1½-inch, \$22.50; 2-inch, \$27; 2½-inch, \$36; 3-inch, \$45; 3½-inch, \$55; 4-inch, \$108.

**Plates and Sheets.—Steel.**—The market is steady. Quotations are: \$2.20 for 3-16; \$2.30 for ¼, and \$2.10 for ½ and thicker; 12-gauge being \$2.30; 14-gauge, \$2.15; and 16-gauge, \$2.10. (111).

**Rails.**—Quotations on steel rails are necessarily only approximate and depend upon specification, quantity and delivery required. A range of \$30.50 to \$31 is given for 60-lb. and 70-lb.; 80-lb. and heavier, being \$30; rails, per gross ton of 2,240 lbs., f.o.b. mill. Re-laying rails are quoted at \$27 to \$29 per ton, according to condition of rail and location. (73).

**Railway Ties.**—See Lumber, etc.

Toronto, March 17th, 1910.

Opinions are divided as to the prospect of a tariff war with the United States, with, however, the weight of feeling that such a thing is unlikely. If our neighbors to the south should prove arrogant, Canadians have still the same recourse that they had when the McKinley Tariff was intended to "squeeze" them. That is, we can cultivate all the closer relations with markets beyond seas, and in so doing build up our marine transportation interests.

The signs look hopeful for an active spring trade. Much building is in prospect in both country and city. A record production goes on abroad in most, if not all, ingot metals, whose prices, notwithstanding, are generally steady. In iron and steel, quotations are well maintained.

Among camp supplies, the advance in meats and lard is pronounced. Barrel pork is higher; so also are dry and smoked salt meats. Eggs, on the other hand, are lower; sugar higher.

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

**Antimony.**—Demand quiet at 9c. per 100 lbs. (111).

**Axes.**—Standard makes, double bitted, \$8 to \$10; single bitted, per dozen, \$7 to \$9.

**Bar Iron.**—\$2.00 to \$2.10, base, per 100 lbs., from stock to wholesale dealer. Market supply limited. (111).

**Bar Mild Steel.**—Per 100 lbs., \$2.10 to \$2.20.

**Boiler Plates.**—¼-inch and heavier, \$2.20. Boiler heads 25c. per 100 pounds advance on plate. Tank plate, 3-16-inch, \$2.40 per 100 lbs.

**Boiler Tubes.**—Orders continue active. Lap-welded, steel, 1¼-inch, 10c.; 1½-inch, 9c. per 10 feet; 2-inch, \$8.50; 2½-inch, \$10; 3-inch, \$11 to \$11.50; 3½-inch, \$18 to \$18.50 per 100 feet.

# MACHINERY BUILT TO ORDER

Send us plans or sketches of proposed new machinery and we will quote prices for building and erecting it.

We can execute special orders in a first-class manner and at a fair price as we operate a well-equipped shop for the efficient production of our own line of—

## PULP AND PAPER MAKING MACHINERY

If interested in this line please send for catalogue and specifications of

PULP THICKENERS, WET MACHINES, CYLINDER MOLDS, COUCH & PRESS ROLLS, PNEUMATIC SAVE-ALLS.

SHERBROOKE MACHINERY CO., LTD. SHERBROOKE, QUE.



**Bricks.**—Prospects excellent for business in 1910. Price at some yards \$9 to \$9.50, at others, \$9.50 to \$10 for common. Don Valley pressed brick are in request. Red and buff pressed are worth \$18 delivered and \$17 at works per 1,000.

**Broken Stone.**—Lime stone, good hard, for roadways or concrete, f.o.b., Schaw station, C.P.R., 75c. until further notice, per ton of 2,000 lbs., 1-inch, 2-inch, or larger, price all the same. Rubble stone, 55c. per ton, Schaw station, and a good deal moving. Broken granite is selling at \$3 per ton for good Oshawa. (164).

**Cement.**—Car lots, \$1.60 per barrel, without bags. In smaller parcels \$2.30 is asked by city dealers, with bags, (26, 164).

**Coal.**—Retail price for Pennsylvania hard, \$7.25 net, steady. This price applies to grate, eggs, stove, and chestnut; only pea coal is cheaper, namely, \$6.00. These are all cash, and the quantity purchased does not affect the price. In the United States there is an open market for bituminous coal and a great number of qualities exist. We quote. Youghiogheny lump coal on cars here, \$3.70 to \$3.80; mine run, \$3.60 to \$3.75; slack, 2.65 to \$2.85; lump coal from other districts, \$3.40 to \$3.70; mine run 10c. less; slack, 2.50 to \$2.70; cannel coal plentiful at \$7.50 per ton; coking, Solvay foundry, which is largely used here, quotes at from \$5.75 to \$6.00; Reynoldsville, \$4.90 to \$5.00; Connellsville, 72-hour coke, \$5.50. Soft coal and slack are slowly growing less scarce.

**Copper Ingot.**—The consumption is larger than ever, but production may be said to beat the record. Such conditions afford play for the speculators. Price here, 14 1/2 c. per lb., and the demand active.

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

**Dynamite**, per pound, 21 to 25c., as to quantity. (83.)

**Felt Roofing.**—A good prospect for spring trade at an unchanged price, which is \$1.80 per 100 lbs.

**Fire Bricks.**—English and Scotch, \$30 to \$35; American, \$25 to \$35 per 1,000. Fire clay, \$8 to \$12 per ton.

**Fuses.**—Electric Blasting.—Double strength 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, per 100 count. Bennett's double tape fuse, \$6 per 1,000 feet.

**Iron Chain.**—1/4-inch, \$5.75; 5/16-inch, \$5.15; 3/8-inch, \$4.15; 7/16-inch, \$3.95; 1/2-inch, \$3.75; 9/16-inch, \$3.70; 5/8-inch, \$3.55; 3/4-inch, \$3.45; 7/8-inch, \$3.40; 1-inch, \$3.40, per 100 lbs.

**Iron Pipe.**—A steady request at former prices:—Black, 3/4-inch, \$2.03; 1/2-inch, \$2.25; 3/4-inch, \$2.63; 1/2-inch, \$3.28; 1-inch, \$4.70; 1 1/4-inch, \$6.41; 1 1/2-inch, \$7.70; 2-inch, \$10.26; 2 1/2-inch, \$16.39; 3-inch, \$21.52; 3 1/2-inch, 27.08; 4-inch, \$30.78; 4 1/2-inch, \$35.75; 5-inch, \$39.85; 6-inch, \$51.70. Galvanized, 1/2-inch, \$2.86; 3/8-inch, \$3.08; 1/2-inch, \$3.48; 3/4-inch, \$4.43; 1-inch, \$6.35; 1 1/4-inch, \$8.66; 1 1/2-inch, \$10.40; 2-inch, \$13.86, per 100 feet. (74, 188).

**Pig Iron.**—There is great activity and prices are maintained. Clarence quotes at \$21 for No. 3; Cleveland, \$20.50 to \$21, Summerlee, for winter delivery, \$22.50 in Canadian pig, Hamilton quotes \$19.50 to \$20 per ton. Producing plants are everywhere busy, and there is considerable business in prospect for 1910.

**Lead.**—An active demand at previous prices, which are \$3.75 to \$3.85 per 100 lbs.

**Lime.**—Retail price in city 35c. per 100 lbs. f.o.b., car; in large lots at kilns outside city 22c. per 100 lbs. f.o.b. car without freight. Demand is moderate.

**Lumber.**—Prices are generally firm, especially in pine. We quote dressing pine \$32.00 to \$35.00 per M; common stock boards, \$26 to \$30; cull stocks, \$20; cull sidings, \$17.50; Southern pine dimension timber from \$30 to \$45, according to size and grade; finished Southern pine according to thickness and width, \$30 to \$40. Hemlock in car lots, \$16.50 to \$17; spruce flooring in car lots, \$22 to \$24; shingles, British Columbia, are higher, we quote \$3.10, lath growing scarce and stiffening, No. 1, \$4.40, white pine, 48-inch; No. 2, \$3.75; for 32-inch, \$1.60.

**Nails.**—Wire, \$2.35 base; cut, \$2.60; spikes, \$2.85 per keg of 100 lbs.

**Pitch and Tar.**—Pitch, unchanged at 70c. per 100 lbs. Coal tar dull at \$3.50 per barrel. This is the dead season.

**Plaster of Paris.**—Calcined, New Brunswick, hammer brand, car lots, \$1.95; retail, \$2.15 per barrel of 300 lbs.

**Putty.**—In bladders, strictly pure, per 100 lbs., \$2.25; in barrel lots, \$2.10. Plasterer's, \$2.15 per barrel of three bushels.

**Ready Roofing.**—Little doing; prices are as per catalogue.

**Roofing Slate.**—Most of the slate used in Canada comes now from Pennsylvania or Maine, the Canadian supply being slender and mostly from the Rockland quarries of the Eastern Townships in Quebec. There is a great variety of sizes and qualities, so that it is difficult to indicate prices. But No. 1 Bangor slate 10x16 may be quoted at \$7 per square of 100 square feet, f.o.b., cars, Toronto; seconds, 50c. less. Mottled, \$7.25; green, \$7, with a prospect of advance. Dealers are beginning to be busy.

**Rope.**—Sisal, 1/2 c. per lb.; pure Manila, 10 1/2 c. per lb., Base.

**Sand.**—Sharp, for cement or brick work, 90c. per ton f.o.b., cars, Toronto siding.

**Sewer Pipe.**—

	4-in.	6-in.	8-in.	10-in.	12-in.	24-in.
Straight pipe per foot	\$0.20	\$0.30	\$0.65	\$0.75	\$1.00	\$3.25
Single junction, 1 or 2 ft. long	.00	1.35	2.70	3.40	4.50	14.65
Double junctions	1.50	2.50	5.00	....	8.50	....
Increases and reducers	....	1.50	2.50	....	4.00	....
P. traps	2.00	3.50	7.50	....	15.00	....
H. H. traps	2.50	4.00	8.00	....	15.00	....

Business moderate; price, 73 per cent. off list at factory for car-load lots; 65 per cent. off list retail. (52, 84, 138).

**Steel Beams and Channels.**—Quiet.—We quote:—\$2.50 to \$2.75 per 100 lbs., according to size and quantity; if cut, \$2.75 to \$3 per 100 lbs.; angles, 1 1/4 by 1-16 and larger, \$2.50; tees, \$2.80 to \$3 per 100 pounds. Extra for smaller sizes of angles and tees. (4, 30, 41, 50, 118, 119, 127, 132, 145, 176).

**Steel Rails.**—80-lb., \$35 to \$36 per ton. The following are prices per gross ton, for 500 tons or over; Montreal, 12-lb. \$45, 16-lb. \$44, 25 and 30-lb. \$42.

**Sheet Steel.**—The market continues steady; American Bessemer, 10-gauge, \$2.50; 12-gauge, \$2.55; 14-gauge, \$2.35; 17, 18, and 20-gauge, \$2.45; 22 and 24-gauge, \$2.50; 26-gauge, \$2.65; 28-gauge, \$2.85. Quite a good demand exists, and there is prospect of higher prices.

**Sheets Galvanized.**—Apollo Brand.—Sheets 6 or 8 feet long, 30 or 36 inches wide; 10-gauge, \$2.90; 12-14-gauge, \$3.00; 16, 18, 20, \$3.10; 22-24-

# SHEETS!

Aluminum                      Lead  
Brass                              Tinned  
Copper                            Zinc

At lowest prices for prompt deliveries.

**A. C. LESLIE & Co., Limited**  
MONTREAL.                      7

\$3.25; 26, \$3.40; 28, \$3.85; 29, \$4.15; 10 3/4, \$4.15 per 100 lbs. Fleur de Lis—28-gauge, \$4; 26, \$3.80 per 100 lbs. A very large tonnage of all sorts has been booked. The feeling is toward an advance. (111).

**Tank Plate.**—3-16-inch, \$2.40 per 100 lbs.

**Tool Steel.**—Jowett's special pink label, 10 1/2 c. Cammel-Laird, 16c. "H.R.D." high speed tool steel, 65c. (4).

**Tin.**—Unsettled in price, various interests contending. At present we quote lower, at 33 1/2 to 34c.

**Wheelbarrows.**—Navy, steel wheel, Jewel pattern, knocked down, \$21.60 per dozen; set up, \$22.60. Pan Canadian, navy, steel tray, steel wheel, \$3.30 each; Pan American, steel tray, steel wheel, \$4.25 each. (132).

**Zinc Spelter.**—A very active movement continues, and a large business is being done. Price as before, \$5.75 to \$6 per 100 lbs.

## CAMP SUPPLIES.

**Butter.**—Dairy prints, 23 to 24c.; creamery prints, 20c. per lb.

**Canned Goods.**—Peas, \$1.10 to \$1.50; tomatoes, 3s, 85c. to 95c.; pumpkins, 3s, 80 to 85c.; corn, 80 to 85c.; peaches, 2s, white, \$1.50 to \$1.60; yellow, \$1.90 to \$1.95; strawberries, 2s, heavy syrup, \$1.50 to \$1.85; raspberries, 2s, \$1.50 to \$1.95. (38).

**Cheese.**—Moderately firm; large, 13c.; twins, 13 1/2 c.

**Coffee.**—Rio, green, 11 to 12 1/2 c.; Mocha, 21 to 23c.; Java, 20 to 31c.; Santos, 11 to 15c.

**Dried Fruits.**—Raisins, Valencia, 5 1/2 to 6 1/4 c.; seeded, 1-lb. packets, fancy, 7 1/2 to 8c.; 16-oz. packets, choice, 7 to 7 1/2 c.; 12-oz. packets, choice, 7c.; Sultanas, good, 5 to 6c.; fine, 6 to 7c.; choice, 7 to 8c.; fancy, 8 to 9c.; Filiatras currants, 6 1/2 to 7c.; Vostizas, 8 1/2 to 9c.; uncleaned currants, 4c. lower than cleaned. California Dried Fruits.—Evaporated apricots, 15 to 16c. per lb.; prunes, 60s to 70s, 7 1/2 to 8c.; 90s to 100s, 6c.; evaporated apples, 8c. (38).

**Eggs.**—New laid, free receipts, good demand, 25 to 26c. per dozen, in case lots.

**Flour.**—Manitoba Flour.—Quotations at Toronto are:—First patents, \$5.60; second patents, \$5.10; strong bakers', \$4.90; 90 per cents., Glasgow freights, 28s. 6d. Ontario Flour.—Winter wheat patents, for export, \$4.20 to \$4.25, in buyers' sacks outside.

**Lard.**—In small supply, and again advanced. Tierces, 16 1/4 c.; tubs, 16 1/2 c.; pails, 16 1/4 to 17c.

**Molasses.**—Barbadoes, barrels, 37 to 45c.; West Indian, 27 to 30c.; New Orleans, 30 to 33c. for medium.

**Pork.**—Market uncertain. Short cut, 29 to \$30 per barrel; mess, \$27 to \$28. Light stocks and not much doing.

**Rice.**—B. grade, 3 1/2 c. per lb.; Patna, 5 to 5 3/4 c.; Japan, 5 to 6c.

**Salmon.**—Fraser River, talls, \$2; flats, \$2; River Inlet, \$1.50 to \$1.75.

**Smoked and Dry Salt Meats.**—Long clear bacon, 15 to 15 1/2 c. per lb., tons and cases; hams, large, 15 1/2 c.; small, 16 1/2 to 17c.; rolls, 15 to 15 1/2 c.; breakfast bacon, 18 1/2 c.; backs (plain), 19c.; backs (peameal), 19 to 20c.; shoulder hams, 13 1/2 c.; green meats out of pickle, 1c. less than smoked. Market very firm.

**Spices.**—Allspice, 16 to 19c.; nutmegs, 30 to 75c.; cream tartar, 22 to 25c.; compound, 15 to 20c.; pepper, black, pure Singapore, 14 to 17c.; pepper, white, 20 to 30c.

**Sugar.**—Granulated, \$5.20 per 100 lbs., in barrels; Acadia, \$5.10; yellow, \$4.80; bags, 5c. lower.

**Syrup.**—Corn syrup, special bright, 3 1/4 c. per lb.

**Teas.**—Japans, 20 to 35c. per lb.; Young Hysons, 16 to 35c.; Ceylons, medium, 16 to 45c.

**Vegetables.**—Beans, hand-picked, \$2.35; prime, \$2.25; stocks light, market firm; beets, 85c. a bag; carrots, 60 and 65c. a bag; onions, \$1.25 a bag; potatoes, best, 65 and 70c. a bag; turnips, 45c. a bag. (38).

## TORONTO HORSE MARKET.

The Toronto horse market is a little quieter this week, with a fair demand. North-West trade is smarter, with prices standing about the same as last week.

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Winnipeg, March 15th, 1910.

The Western market continues to be very active, and already supplies are beginning to move. Large shipments of steel are commencing to come forward, and from the present outlook, brick, cement, and other material will have a big run in the West this season. Large contracts are being let daily for extensive works, not only in Winnipeg but in the other large cities of the West. Prices remain steady in all lines, the only uncertainty being cement and lumber, and there is not much likelihood of any advance taking place in the latter, as far as can be seen at the present time. The demand for building paper and nails is very good, and large orders are coming in from country points. Local architects have a great deal of work in hand now for new buildings, and from the present outlook every avail-

(Continued on page 50).