

PAGES

MISSING

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The Canadian Engineer

ESTABLISHED 1893.

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BILL No. 81.

AN ACT TO AMEND THE MUNICIPAL ACT.

At the last session of the Ontario Legislature, Bill No. 81, to amend the Municipal Act, was introduced by Mr. W. H. Hoyle, the member for North Ontario. The Bill was referred to the Municipal Committee for consideration, and because of the unusual features presented in it the Committee decided to have the Bill, together with several sections of the Municipal Act referred to or affected, printed and distributed.

This Bill is of particular interest to civil engineers, because it provides that every bridge constructed as a county bridge shall be in accordance with specifications (and, we presume, plans) prepared by the Department of Public Works of Ontario. The Bill goes further and gives to the county exclusive jurisdiction over bridges of

fifty feet and more in length, excepting those situated within the city or a separate town, and makes the county liable for the construction and maintenance of all such bridges.

The clauses which will interest members of the profession most are clauses (1), (2) and (3) of Section 618a of the Municipal Act:—

(1) Every bridge constructed by or under the jurisdiction and control of the corporation of a county shall be built of iron, steel or reinforced concrete and in accordance with standard specifications, prepared by the engineer of the Department of Public Works of Ontario.

(2) It shall be the duty of the said engineer to furnish the corporation of any county with such information as the council of the county may require with reference to the construction of bridges in the county.

(3) Where a bridge has been constructed by the corporation of a county in accordance with such plans and specifications and has been inspected and approved of by the engineer of the Department of Public Works, or any officer of the Department named by the Minister of Public Works, and is maintained and kept in repair as provided by the specifications of the Department, and is not obstructed or otherwise rendered unsafe by the action of the corporation, its officers or servants, the corporation of the county shall not be liable for any damages under Section 606 of this Act.

These sections clearly indicate that the purpose of the member for North Ontario is to make the Department of Public Works of Ontario a large department, with control over the design, erection, inspection and maintenance of the county bridges of the Province.

The Engineering Division of the Department of Public Works of Ontario has done splendid service for the Province, but this attempt to load upon the Department the engineering difficulties of the counties, and to require that the counties accept designs which must be prepared in a wholesale manner and disposed of as catalogues, or in a manner somewhat similar to the much-advertised "best 100 house designs."

It would be very unfortunate for the Province if Bill No. 81 should become law. It would be unfortunate, because it would prohibit the construction of concrete bridges on county work. It would centralize at a point, in many cases hundreds of miles distant from the place of operation, the staff responsible for the construction and maintenance of the structures. It would eliminate from the design the evidence of intimate knowledge, location, traffic, possible high-water mark and that elasticity in design which makes a bridge not mar, but add to the beauty of the landscape.

The taxpayer will be the loser, for, although he might save a few dollars in fees, he would quickly remove that incentive for good work—competition—which has

done so much to improve the design, increase the safety and add to the beauty of our highway bridges.

As we said before, the Engineering Division of the Department of Public Works, although a small body of men, have done excellent service for the Province, but to undertake this new work it would require the organizing and maintaining of a large staff of designers and inspectors, who, following in the footsteps of the average man when placed on salary, with no incentive for improved work, excepting the sting of his own conscience, drifts along, would spend more time shirking work than laboring for better methods of solving familiar problems.

Nothing will be gained by this centralization scheme. The Province of Ontario will not be likely to secure, on the staff of the Department, specialists in this work. In the past, the counties have had at their disposal the services of a number of engineers who have made this work their particular study. These men have too much initiative and originality to accept the small remuneration usually offered for junior positions in Government services.

The people are interested in this measure, but so is the engineering profession. To the engineering profession a measure of this kind would have much the same relation to their profession as the patent medicine manufacturer to the medicine profession. The Canadian Society of Civil Engineers and the Engineers' Club should carefully consider this measure and have some considerable say in its final disposition.

TORONTO STREET RAILWAY AND THE STRIKE.

Following the Grand Trunk strike, the uneasiness among the employees of the Toronto Street Railway caused considerable anxiety as to the outcome of the conferences between the Street Railway and the employees.

When the Railway refused to accede to the demands of the men, a Board of Conciliation was appointed, and although, at first, it appeared as if their labors would be useless, yet after much effort on the part of the Chairman of the Board, the Railway and the men agreed on the following schedule. The present rate and rate asked by the men is also given:—

	Present Rate.	Asked by Men.	Granted in Report.
Motormen and Conductors—			
First year	20	25	21
Second year	22	28	23
Third year and after...	23½	28	25
Shedmen—			
Foremen .....	..	..	25
Assistants	21	25	22
Car washers	20	25	21
Motor and Track Repairmen—			
First year	20	25	21
Second year	22	28	23
Third year and after...	23½	28	25

The agreement is to remain in effect for two years, as requested by the men.

But in this new arrangement there will be added to the Street Railway expenses \$83,000 annually.

Taking the Railway figures for 1909, this will represent almost one-half of their net earnings, but if the increase in net earnings of 1910 over 1909 are in the same

proportion as the increase of 1909 over 1908 it will not represent one-half of the net increase.

In addition to the salary increases mentioned in the above schedule there were some seventeen other terms of the agreement, each of which more clearly defined than in the past, the position of the men and the character of the improvements required of the Company, but the one matter which was the cause of some considerable dissatisfaction was that referring to the hours men had to lose in waiting for their runs. No definite arrangements were reached other than that the general manager promised to do what he could to make it easier for the men to get in their ten hours' time without losing so many hours waiting for their run.

AGAINST PRISON LABOR.

For some months the Provincial Government has been utilizing upon the highways of some of the northern townships prison labor. Recently, a largely-signed petition was sent to the Department of Public Works for Ontario in which the petitioners objected to the use of prison labor for this purpose. The petition read as follows:—

"We, the undersigned citizens of Temiskaming, hereby protest against the utilization of prison labor in competition with free labor on the roads of Porcupine and Matheson, and earnestly request its discontinuance, as we believe such a proceeding to be derogatory to the ethics and interests of a civilized and liberty-loving country."

It is not expected that the petition will lead to the withdrawing of these laborers from the road nor to a change of policy on the part of the Government. There are about ninety prisoners now at work on the roads operating from two camps, and the men much prefer the outdoor life, even if the work is harder, than the confinement of the county jails, and the county officials are of the opinion that this treatment of the lesser offenders will be more reformatory.

EDITORIAL NOTE.

Up to August 14th Winnipeg's building permits for the year amounted to over \$11,000,000.

UNION OF CANADIAN MUNICIPALITIES.

Programme of Tenth Annual Convention, City Hall, Toronto. The Union of Canadian Municipalities hold their annual meeting at Toronto, Ont., August 31st, September 1st and 2nd, 1910.

We give herewith an abbreviated programme. A large attendance is expected.

Wednesday, August 31st.

10.00 a.m.

Delegates will register their name and address.

2.00 p.m.

Convention opens.

Address of welcome, by His Worship, G. R. Geary, Esq., K.C., Mayor of Toronto, Ont.

Reply on behalf of the visiting delegates, by His Worship Hon. J. J. Guerin, M.D., C.M., Mayor of Montreal, Que.

Presidential address, by His Worship, W. Sanford Evans, Esq., Mayor of Winnipeg, Man.

Annual report of the Honorary Secretary-Treasurer, W. D. Lighthall, Esq., K.C., ex-Mayor of Westmount, Que., giving an historical sketch of the Union and a review of the work accomplished since its foundation.

Financial report of the Assistant Secretary, G. S. Wilson, Esq.

8.00 p.m.

Report of Committee on Resolutions.

Unfinished business of last convention.

Report of Special Committee on "Uniform Municipal Statistical Returns, and a Uniform Principle of Municipal Accounting."

- (a) H. J. Ross, Esq., of Montreal, Que., for the Committee.
- (b) Reports from the several Provincial Unions.
- (c) Reports from the several Provincial Governments.

Thursday, September 1st, 1910.

10.30 a.m.

Report of Committee on Resolutions.

"The Ontario Hydro-Electric Power Commission." (Present status of).
Hon. Adam Beck, M.L.A., Ontario, Chairman of the Commission.

"The Export of Water Power."

His Worship, H. Williams, Esq., Mayor of Fort Frances, Ont.

His Worship L. L. Peltier, Esq., Mayor of Fort William, Ont.

His Worship, I. L. Matthews, Mayor of Port Arthur, Ont.

Followed by general conference.

"One of the greatest industrial developments of our time consists of the utilization of water by means of electrically transmitted power."

"The flowing waters of Canada are, at the moment—apart from the soil—our greatest and most valuable undeveloped natural resource. They are more valuable than all our minerals, because, properly conserved, they will never be exhausted."

"We agree that those resources which are necessities of life should be regarded as public utilities, that their ownership entails specific duties to the public and that, as far as possible, effective measures should be adopted to guard against monopoly."

2.30 p.m.

Report of Committee on Resolutions.

"Town Planning and Embellishment."

Benjamin C. Marsh, Esq., of New York, author of "An Introduction to City Planning." Followed by general conference.

"A City without a Plan, is like a ship without a rudder."

"An ounce of City Planning is worth a pound of City Replanning."

"City Planning is the most effective method of projecting municipal efficiency."

"Municipal Taxation."

A. B. Farmer, Esq., of Toronto, Ont., Secretary Tax Reform and Direct Legislation League.

In this paper special attention will be given to the desirability of allowing municipalities to place a lower tax rate on building improvements, and business assessments, than on land values.

"The American Financial Invasion."

A general conference.

8.00 p.m.

Report of Committee on Resolutions.

Extra meeting for the public—Lantern lecture.

"Embellishment of Canadian Cities." H. Bragg, Montreal.

"Public Utility Commissions."

(a) Ontario. H. C. Small, Esq., of Toronto, Ont., Secretary the Ontario Railways and Municipal Board.

(b) Nova Scotia. Stuart Jenks, Esq., LL.B., of Halifax, N.S., Deputy Attorney-General of Nova Scotia.

(c) Quebec. Lieut.-Col. F. W. Hibbard, K.C., of Montreal, Que., President Quebec Public Utilities Commission.

Followed by general conference.

8.00 p.m.

"Boards of Control." (Present Status of).

"Municipal Government by Commission."

(a) Montreal, Que.

(b) Winnipeg, Man.

(c) F. S. Spence, Esq., City Controller, Toronto, Ont.

(d) A. Buscharf, Esq., City Commissioner, Edmonton, Alta.

(e) Ottawa, Ont.

Followed by a general conference.

Friday, September 2nd, 1910.

11.00 a.m.

Report of Committee on Resolutions.

"Automobile Legislation."

(a) A. Whitman, Esq., Alderman, City of Halifax, N.S.

(b) His Worship, George Bell, Esq., Mayor of Enderby, B. C.

(c) His Worship, L. D. Taylor, Esq., Mayor of Vancouver, B. C.

Followed by a general conference.

"Level Railway Crossings."

A general conference.

Election of officers.

PETROL MOTOR ROLLERS.*

By H. T. Wakelam, M. Inst. C. E., F. G. S.

Petrol and paraffin motor-driven rollers have now been in use in connection with road work for about five years.

The regulation of gas air, ignition, and lubrication in connection with the motors is automatic. This point in regard to lubrication is of importance, when the class of man used to driving the rollers is borne in mind.

Motor rollers of a convertible type may be purchased, and by an exchange of the rolling cylinders a roller suitable for grass rolling is obtained.

It is claimed by makers of petrol motor rollers that the depreciation charges need not be greater than for the depreciation of those driven by steam, and that a new motor can be placed on a roller for the same outlay as heavy boiler repairs are carried out in connection with steam rollers.

The construction of the rollers is carried out on the principle adopted for the motors of other heavy vehicles. The motor of the former is, however, somewhat simplified, and strengthened to adapt it to the heavy strain of road reparation work.

The back and front rollers are made of hard cast-iron of ample strength and closeness of grain to afford the necessary wearing properties. The back roller is usually 3 feet in diameter by 4 feet wide, with rounded edges of large radius. It is cast in one piece, and arranged to hold, when desired, an additional weight of about three-quarters of a ton of water.

The steel channel frame is of 5 inches by 2½ inches section, stiffly braced, and the fore part is coupled to the front roller by a steering head and bridge. The bridge is arranged to allow considerable oscillation in connection with the front roller, so that when passing over uneven surfaces the frame remains comparatively steady, and is, by the oscillation allowance, relieved of severe strains. Springs are fitted over the back axle to minimize vibration and strains to the frame, motor and gearing.

*Paper submitted at Brussels International Road Congress.

The total weight of the smaller roller, with heavy back roller empty, is about $6\frac{1}{2}$ tons, and $7\frac{1}{2}$ tons full. When the back roller is filled it carries a weight of about $5\frac{1}{2}$ tons, the remaining weight being on the front of the machine. Petrol rollers are also made to a weight of 12 tons.

The consumption of petrol, or paraffin, varies from about one-third of a gallon an hour for the smaller roller, to about $1\frac{1}{4}$ gallons an hour for the larger size.

The roller is usually speeded to 1 and 3 miles an hour, either forwards or backwards, when the engine is running at its normal revolutions per minute. It is possible to vary the engine speed above or below the normal by a hand control, when a corresponding variation in the travel of the roller follows.

All gears are of steel, and are machine cut, to ensure smooth running. The change speed gears are enclosed within an oil-tight box providing thorough lubrication. Ample allowance is made for shocks and strains to a much higher degree than is met with in regular work.

The chain is of $2\frac{1}{4}$ inch pitch hardened steel, with a breaking strain of 20 tons. Both the wheels on which it runs are machine cut.

The roller is steered by a simple and direct chain arrangement, connecting the front roller to a hand wheel immediately in front of the driver, and the front roller is in two parts to enable it to move quickly and readily in answer to the steering wheel.

A detachable awning of galvanized sheet-iron, for the driver, is carried from the frame, provision being made for canvas or other curtain to be hung as desired.

A band brake, acting on the intermediate shaft, is provided for ordinary use, and an emergency brake, acting on a drum on the back roller, is also supplied.

The motor has a leather-faced cone clutch, suitably designed to transmit the full engine power.

The motor is a governed 2-cylinder engine, giving off 16 brake horse power when running at a speed of 850 revolutions per minute, and the motor is capable of driving the roller, fully loaded, up an incline of about 1 in 5.

The ignition is by low tension magneto, and if petrol only is used an approved carburetter is usually fixed to the motor.

If paraffin is used a specially designed vaporizer is fixed in addition to the carburetter.

The water circulation is usually on the "Thermo-Syphon" principle, no pump being required, and the inlet and outlet pipes are $1\frac{1}{4}$ inches in diameter.

The crank shaft is of steel, of 40 tons tensile strength, the connecting rods are of drop forgings, and the valves are usually of nickel steel.

The chief advantages claimed by the makers for motor rollers are:

- (1) About an hour is saved every morning, owing to the motor being started to work at once by the man in charge, instead of having to wait to get up steam, as with a steam roller.
- (2) No cartage for supplying the motor with coal, as water is required as in the case of a steam roller.
- (3) The rollers being much shorter than steam rollers, they are considered to be less objectionable in traffic than the latter.
- (4) Motor rollers are practically noiseless as compared with a steam roller, and are smokeless.
- (5) The rollers are placed in "tandem fashion"—that is to say, the back roller follows the front roller, and does not consist of two large wheels as in a steam roller.
- (6) For repairs, patching, trench work, tar-macadam and asphalt work the "tandem fashion" construction is claimed to be more convenient than two large back wheels, with their

perimeters extending beyond the line of the front roller, as in steam-driven machines, and

(7) Where new roads are being formed, over soft ground, it is claimed that petrol motor rollers, by reason of their lightness, are an advantage.

The working charges connected with a 5-ton motor roller are stated to be at the rate of about 1s. $6\frac{1}{4}$ d. an hour, including wages, petrol, stores and repairs—equal to about 12s. 2d. per working day. This size roller will consolidate about 3,000 square yards of tarred materials on footpaths in a working day of eight hours duration. In rolling tarred-macadam on carriage-ways the quantity rolled is reduced owing to the interference of other traffic, etc., and it also varies with the rates of the supply and quality of the materials consolidated.

NOVA SCOTIA SOCIETY OF ENGINEERS.

The Nova Scotia Society of Engineers held their fourth annual meeting at Halifax, N.S., August 18 and 19, 1910.

The following is a list of the delegates present: S. Fisher, Sydney; H. Donkin, Deputy Commissioner of Works and Mines; P. A. Freeman, Halifax Electric Tramway, Halifax; J. W. McKenzie, Assistant Good Roads Commissioner, Halifax; R. McColl, Provincial Engineer, Halifax; W. L. Bishop, Dartmouth; W. G. Yorston, Sydney; F. W. W. Doane, City Engineer; J. G. McKenzie, Westville; J. L. Allen, Dartmouth; F. H. Sexton, principal Technical College, Halifax; D. McD. Campbell, Assistant City Engineer, Sydney; Prof. Hewardine, Provincial Technical College; R. W. McKenzie, Sydney; John R. McKenzie, Windsor; E. Kaizer, Halifax; J. Wright, N. S. Telephone Co.; W. Dolan, N. S. Telephone Co.; P. Colpitt, City Electrician; W. A. Hendry, Chief Engineer Halifax & Guysboro Railway; A. G. Robb, Amherst; J. D. Briggs, superintendent construction N. S. Telephone Co.; J. Belliveau, F. G. McPherson, H. A. Russel, R. Anderson; J. W. McKenzie, A. R. MacCleave, Jas. Farquhar, Halifax; Fred. A. Bowman, Sydney; J. A. Comeau, Halifax; J. S. Misener, Dartmouth.

Water Powers in N. S.

The paper on "The Water Powers of the Province of Nova Scotia," by W. G. Yorston, C.E., of Pictou, was a very interesting one and attracted much attention. Mr. Yorston has been connected with the water powers of the province for some time and is an enthusiast on the subject. He believes Nova Scotia's water powers are destined to become of great value in her industrial life, and he watches carefully the increasing development of those powers. While holding those views, Mr. Yorston does not attempt to compare them in magnitude with those of sister provinces in the Dominion.

In his paper Mr. Yorston said Nova Scotia, for its size, is one of the richest provinces in Canada, and its resources are for the most part only in the beginning of development. Projecting into the Atlantic it was only natural that inhabitants of the province so largely depend upon products of the sea for a living. But Nova Scotia is rich in minerals and forests that cannot long lie undeveloped.

He referred to the coal mining and lumbering interests, and said it is beginning to be realized that our forests are being rapidly depleted and that we are awakening to the fact that much of it has been sacrificed. It is not improbable that in a few more years will be heard a similar cry regarding the coal deposits. People are beginning to take cognizance of the fact that the great natural resources of the country are available and worthy of preservation. Already in the province a halt has been called in reckless disposition of Crown lands.

Before the perfection of the steam engine water powers were largely depended on to furnish power for all kinds of in-

(Continued on Page 229.)

THE Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND WATER PURIFICATION

EXTENSION OF TORONTO WATERWORKS INTAKE.

For some time past members of the City Council and a few members of the Board of Control of the city of Toronto have been very anxious that the intake of the waterworks pumping plant be extended some 2,000 feet out into Lake Ontario, those anxious for the extension of the intake claiming that pure water will be obtained, some going so far as to maintain that the extension will do away with the necessity for the filtration plant.

The Board of Control ordered that samples be taken along a proposed line of extension, and from time to time published results would indicate that the extension, if made, would be into impure water. Herewith we give the analysis for August 10th:—

	Colonies of bacteria per cubic centimeter.	
	25 ft. from surface of lake.	10 ft. from bottom of lake.
At intake	330	310
500 feet out	380	460
1,000 feet out	490	390
1,500 feet out	130	460
2,000 feet out	200	250

The curious thing about the analysis was that the only traces of coli commune, or sewage, were found 2,000 feet out from shore and 1,000 feet west of the line of the intake pipe.

DEODORIZING SEWER GAS.

About a year ago, the city of Winnipeg installed a Webb lamp to use in connection with deodorizing the gas coming from the sewers on the main streets.

A new sanitary experiment is now being made in connection with the sewer gas in Winnipeg. The Winnipeg representative of Lovell & Co., Chicago, has made arrangements to install deodorizers at \$75.00 each, and, in addition, the city is to pay 20 cents per deodorizer, per day, for maintenance. This arrangement is on condition that the deodorizer passes tests satisfactory to the City Engineer.

The new contrivance will be placed at the opening of a sewer, and it is expected that the natural and characteristic sewer smell will be replaced by an odor of formaldehyde.

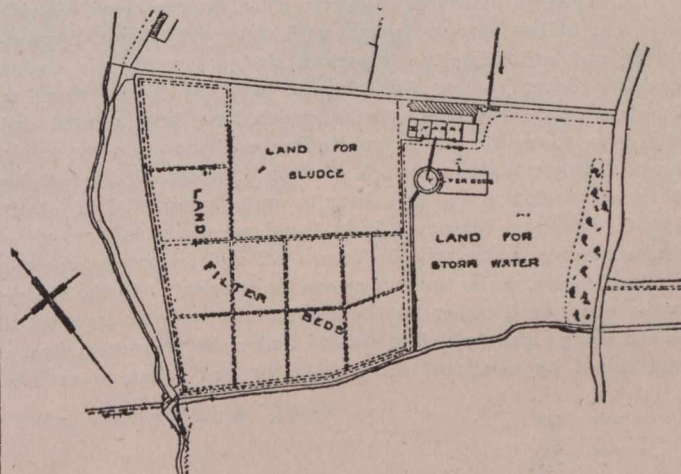
This smell of formaldehyde should not be perceptible at a greater distance than ten or twelve feet from the man-holes, whereas the sewer gas, with a favorable wind, may be detected at a distance of several hundred yards.

SEWAGE DISPOSAL WORKS AT BUSHEY.*

By Ernest E. Ryder, Surveyor, Bushey Urban District Council.

It has frequently appeared to the author that a great deal of valuable time is wasted in the large amount of irrelevant matter which usually forms the bulk of papers submitted to professional bodies, and in the description of the above works I have endeavored to describe only that which I hope will prove of interest to you.

In the early nineties the parish of Bushey, which then formed part of the rural district of Watford, was sewered, and with the exception of a small portion of the district the whole of the sewage was gravitated to an area of land about 16 acres in extent. The scheme provided for the treatment of the sewage by chemical precipitation and intermittent downward filtration through a series of prepared land beds.



Plan of Old Sewage Works, Bushey.

Owing to various complaints from the Thames Conservancy as to the condition of the effluent which was being discharged into the River Colne, several suggestions were made and schemes devised, but little was done until the early part of last year, when my council accepted my proposals, and after the usual formalities a contract was entered into with Messrs. Cunliffe & Sons, Limited, Birmingham, and the new works commenced in June of last year.

Description of Works.

The sewage on arrival of the outfall is first passed through either of two screening chambers, which are fitted with coarse screens, after which it gravitates along an open delivery channel to the circular sedimentation tank. In this delivery channel a weir with recording apparatus is fixed, by means of which it will be possible to ascertain the volume arriving at the works, and so enable the manager to calculate what area of

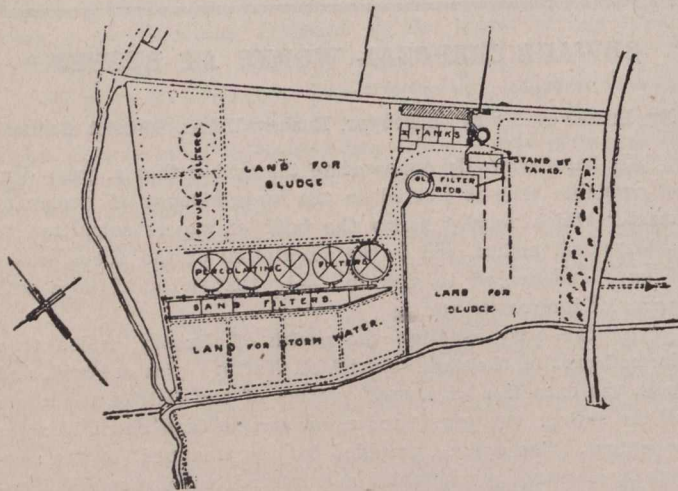
*Paper read at a recent Southeastern District Meeting of the Institution of Municipal Engineers at Bushey.

bacteria beds should be put into use. Any excess beyond three times the dry-weather flow will pass over the overflow weir for the separate treatment which is described later.

The circular sedimentation tank is 28 feet diameter and 14 feet deep, and has a nett capacity of 53,500 gallons. It is fed from the distributing channel by means of No. 6 6 inch cast-iron pipes, the inlets being submerged and 9 feet 6 inches below top water level, the object being to deposit the heavier matters which are drawn off by means of the 6 inch sludge drain and taken by gravitation on to an area of land situate

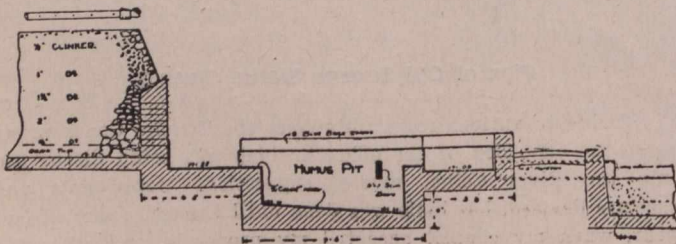
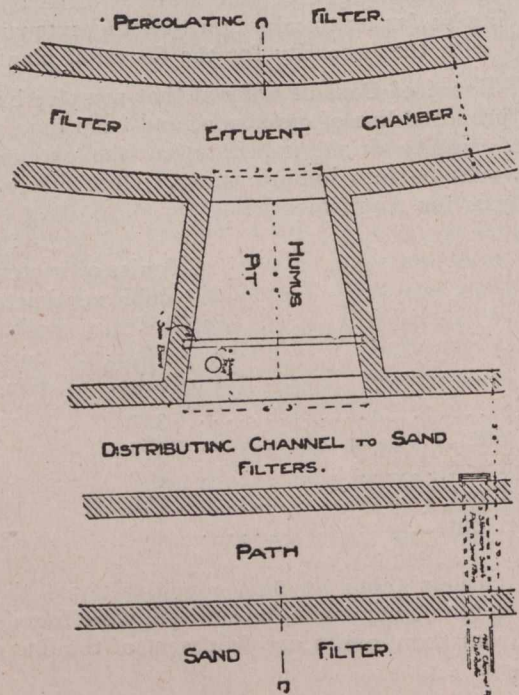
vided with sluice valves so that one or more sprinklers can be used as may be required. The main supply pipe is continued beyond the No. 5 filter for the purpose of "washing out" when necessary.

The five percolating filters are each 90 feet diameter, 4 feet 9 inches deep on the top side, and 5 feet 3 inches deep on the low side. The "filling" is good, hard furnace clinker. The bottom layer (1 foot thick) is of large clumps, to within 6 inches of the top is clinker passed through a 2 inch ring and rejected by a 3 inch ring, while the top layer (6 inches thick) has a gauge $\frac{3}{4}$ inch. The floors are composed of Portland cement concrete 6 inches thick, rubbed up to a smooth face, and the sub-drainage is by means of a special tile designed by myself and made for the contractor by the Albion Clay Company, Limited. The tiles are carried through the walls and have a fall of 1 in 180, discharging the effluent into the circular channel, which is 3 feet in width. Walls are built about half-way up the filter and finished on top with special copings with the top face pitching towards the clinker, the remaining height being of large clumps of clinker hand-packed and having a slight batter.



Plan of New Sewage Works, Bushey.

at the southeast corner of the farm. The tank is provided with a patent helical scraper, geared and worked by hand, for agitating and collecting the deposited sludge towards the sludge outlet. After passing this circular tank the sewage flows to the four old precipitation tanks, which have been altered and added to so as to act as continuous sedimentation or septic tanks. These tanks are each 40 feet 6 inches by 35 feet by 4 feet 6 inches deep, and have a united capacity of about 160,000 gallons. Whenever it is found necessary to empty the tanks the top water will be drawn off and irrigated over the six land filters, while the sludge can be gravitated to the sludge tanks and raised either by the hand chain pump or gravitated to the sludge ram (which is situate under the press-room floor), and raised by means of compressed air and taken to shallow



Bushey Sewage Works: Details of Humus Tank.

trenches on the three acres of land situate west of the buildings. After the sewage has passed through the continuous sedimentation tanks it will be received in a rectangular dosing chamber, which is provided with two of Adams' 30 inch low-draught syphons for dosing the sprinkler filters. This dosing chamber was provided so that when the minimum flow (during the night) was reaching the works the sprinklers would receive a sufficient quantity of liquor to rotate them and so prevent percolation at one place only. After leaving the dosing chamber the liquor gravitates through a cast-iron supply pipe, varying from 15 inches to 9 inches diameter, off which 9 inch branch pipes are taken to the sprinklers, these branch pipes being pro-

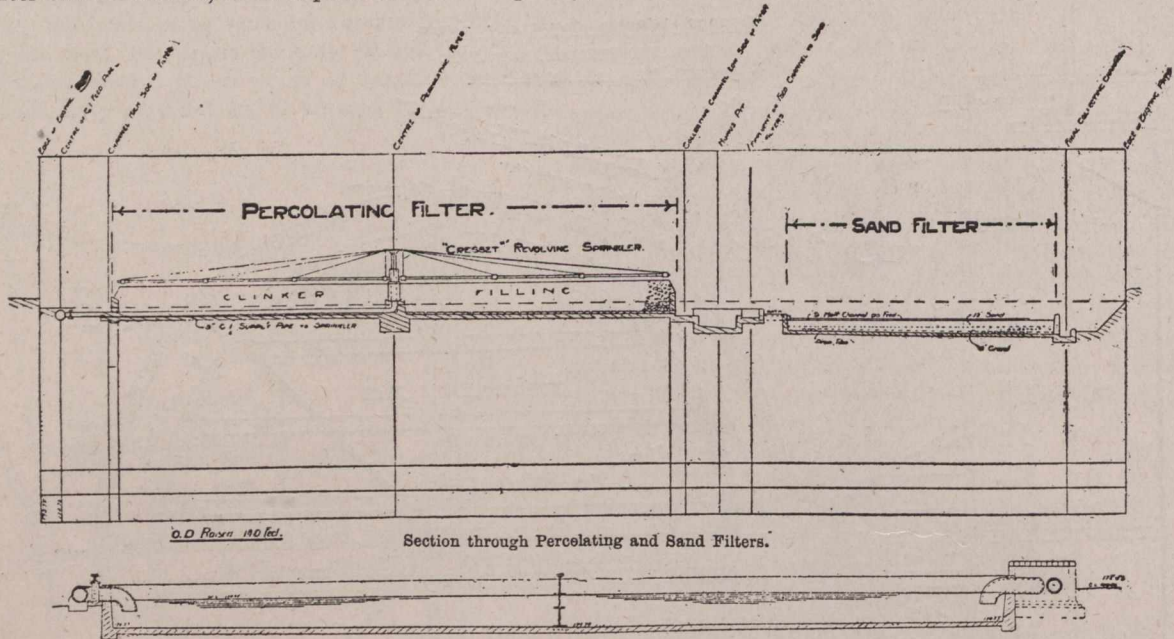
The tank liquor is distributed on to the filters by Adams' patent "Cresset" distributors. These distributors are exceedingly well balanced, and are working under a head of from 6 inches to 18 inches and delivering a variation from one to three volumes. After leaving the circular channel the effluent from each filter passes through a "humus pit," and thence to a collecting channel 3 feet wide and constructed dead level. The humus which is arrested in the above pits can be drawn off and gravitated to the area of land as shown on general plan. When the effluent has reached the collecting channel it can either be gravitated right away to the River Colne or distributed over the sand filters.

The sand filters are six in number, and are constructed of concrete floors and walls, the top of the outside walls being finished with double bull-nosed blue Staffordshire bricks. The filling is 6 inches of coarse gravel and 6 inches of pea gravel, with 9 inches of sharp sand on top. The whole of the material was clean washed before being placed in the beds. The distribution is by means of hand-regulated valves discharging on to 9 inch half-pipe carriers fixed dead level. When the effluent

has passed through the sand and gravel it is collected by means of 6 inch and 4 inch agricultural pipes and discharged into the final effluent channel connected to the 15 inch main effluent drain, and eventually gravitated to the River Colne.

I have endeavored, wherever possible, to arrange for the sewage, after tank treatment, to be exposed to the atmosphere;

gravitated and irrigated where shown and the sludge gravitated to shallow trenches on the area which has been mentioned in connection with the circular sedimentation tank. The top water from these tanks can also be made to discharge on to the old roughing filter; this filter will only be used in time of storm, and, as the sewage will then be very diluted, I am of



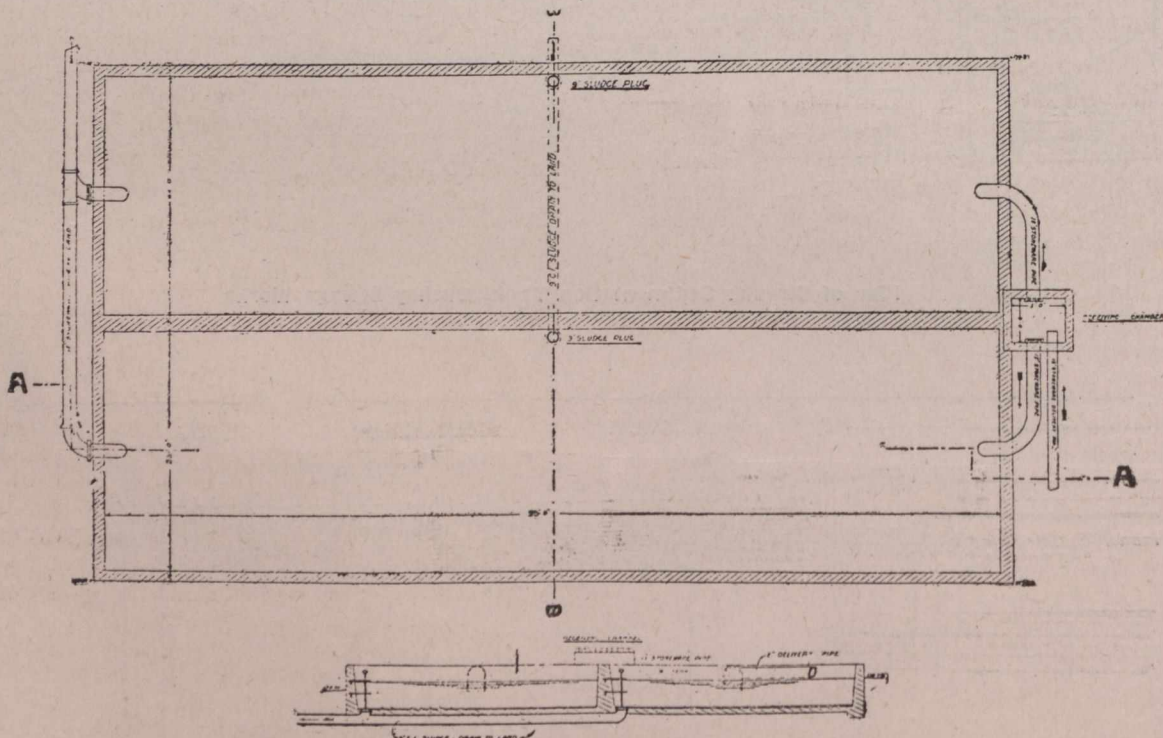
SECTION A. A.

it will be noticed that the collecting and delivery channels have ample width for this purpose. I will now describe the arrangement for dealing with storms:

In the delivery channel described in the early part of this report a storm-overflow weir has been fixed at such a level so

opinion that it will produce a satisfactory effluent. I may mention that if at any time it is desired to close down the tanks for cleaning purposes provision has been made for taking the crude sewage direct to the land.

The following data may be of interest:



SECTION B. B.

Stand-by or Storm Water Tanks. Bushey Sewage Works.

as to come into operation when the flow exceeds three times the normal; any sewage passing over this will gravitate to a receiving chamber, whence it can be discharged into either or both of the stand-by or storm-water tanks. These tanks are each 82 feet by 22 feet, by 2 feet 9 inches deep, and have a united capacity of about 62,000 gallons. The top water can be

Population draining to the works (estimated in 1907).	6,500
Dry-weather flow	250,000 gallons.
Capacity of Tanks.	
Circular sedimentation	53,000 gallons.
Four rectangular	160,000 gallons.

Dosing chamber	5,000	“
Stand-by or storm-water	62,000	“
Sprinkling Filters.		
Area	3,534 sup. yds.	
Capacity	5,890 cub. yds.	
Volume which will be sprinkled on each superficial yard per day (dry-weather flow).....	70.7 gallons.	
Volume which will be sprinkled on each cubic yard per day (dry-weather flow).....	40.7	“
Sand Filters.		
Area	2,300 sup. yds.	
Capacity	1,342 cub. yds.	
Volume which will be distributed on each superficial yard per day (dry-weather flow)....	108.6 gallons.	
Volume which will be distributed on each cubic yard per day (dry-weather flow)	186.2	“

All brick walls have been constructed with blue Staffordshire bricks in cement mortar, concrete walls and floors are built of clean, washed shingle, sand, and Portland cement in the proportions of 5, 2 and 1; glazed stoneware pipes, etc., have been obtained from the Albion Clay Company, Limited, Woodville; cast-iron pipes from Messrs. Stanton & Co., and the whole of the sluice valves, penstocks, sludge plugs and sprinklers from Messrs. Adams-Hydraulics, Limited, York. The contractors, Messrs. Cunliffe & Sons, have carried out the whole of the works in a careful and satisfactory manner.

NOVA SCOTIA SOCIETY OF ENGINEERS.

(Continued from Page 224.)

dustries. Of late years there has been a marked increase in the price of coal, and, as far as can be seen, the prices will not decline, but, on the other hand, will certainly further increase. This being so, it is inevitable that the water powers will receive more attention, in spite of the fact that further improvements will undoubtedly be made in the economy of the steam engine.

Much Power Available.

Recent developments in the transmitting of energy, particularly in the line of electricity, have so improved that it is quite possible to utilize water powers which have hitherto been considered of little value on account of an unfortunate situation, and it is possible to utilize power miles from where it is created. The province has no large rivers and the watersheds are comparatively small. Six hundred square miles was about the largest watershed in the province Mr. Yorston was aware of, and the average watershed of streams is probably not more than one-third of that amount. This is somewhat compensated for by the fact that many of the streams have a rapid descent and offer fairly high heads for the utilization of the water. In the province there are to be found powers capable of development under heads of from 100 to 400 feet, though the watershed is limited in extent. He had investigated one water power having but 10 square miles of watershed, which was well worth development, as there was a total fall of 275 feet in a little over two miles, as well as practically unlimited opportunities for storage of water on the watershed.

In all parts of the province there are water powers well worth development, which have not so far received attention. On other streams development is well advanced, and some few rivers, particularly the Mersey and St. Croix, are at present generating quite an amount of power. Still, at the same time, not one of the streams has the development of its full power completed.

Steam and Water Together.

So far little or no attention has been given to the use of steam power as an auxiliary to water power plants. The chief defect of water power is its great variability. The flow in the dry summer months will be found to be one tenth and less of

the flow in other months when the rain fall is heavier. If steam power were used as an auxiliary to supplement the power in the months of small stream flow, the amount of power to be derived could be made much more constant. But the best power of all is one in which storage reservoirs and steam are both used to increase the amount of power, the ideal power being one with reservoir capacity to equalize the flow over not only a year, but a cycle of years, and thus obliterate the vagaries of the rain fall.

The capacity of the power development of any water power proposition is a problem which requires solving for each individual case.

A factor which enters largely into the case is the cost of development and the annual charges on it as to the saving which can be effected by the use of that amount of water power. If the plant is designed with steam power as auxiliary care must taken in the calculations to find the point at which the saving by using steam power about equals the fixed charges on the cost of developing the water power, and this will be the limit, beyond which it will not be economical to create power by water. It is unfortunate that no data as to stream flow in Nova Scotia is obtainable, the only information on the subject to be had bearing on rainfall records taken at a few places. At times recourse must be had to records of other places distant at times 100 miles, so that calculations based thereon are, after all, only an approximation. A measurement of the flow of any stream taken at extreme high or low water has some value, as it gives a conception of extremes of flow, but measurements must extend over a series of years if the average flow is to be determined with any accuracy.

Mr. Yorston gave comparative rainfall statistics of Halifax and Sydney districts and of Sudbury, Mass., and quoted from a report of a New England committee's report on data relating to awards for water and water power diversions. The committee recognized the danger of laying down approximate rules for determining the amount of power to be derived from watersheds of known fall in New England, and said the subject was one requiring the judgment of one versed in such matters, for different conditions materially affect, not only the amount, but distribution and constancy of the power to be derived from the watersheds.

Little Information.

The value of any water power privilege could be determined after all the data regarding the power had been ascertained, and Mr. Yorston gave examples of procedure in so estimating values of privileges. He frankly acknowledged he was not acquainted with all the water powers in the province. In fact, at this date so little demand for water power has been in evidence that all the facts in connection with some of the best Nova Scotia water powers are not fully known. As a rule, the majority of our large factories are located in the larger centres of population, and for many there are considerations which make this imperative. At the same time there are many uses to which our scattered water powers could be put, of which more vigorous prosecution of mineral development is one. Many of these powers are sufficiently large to warrant the expense of quite lengthy transmission lines in order to utilize the power at more convenient points.

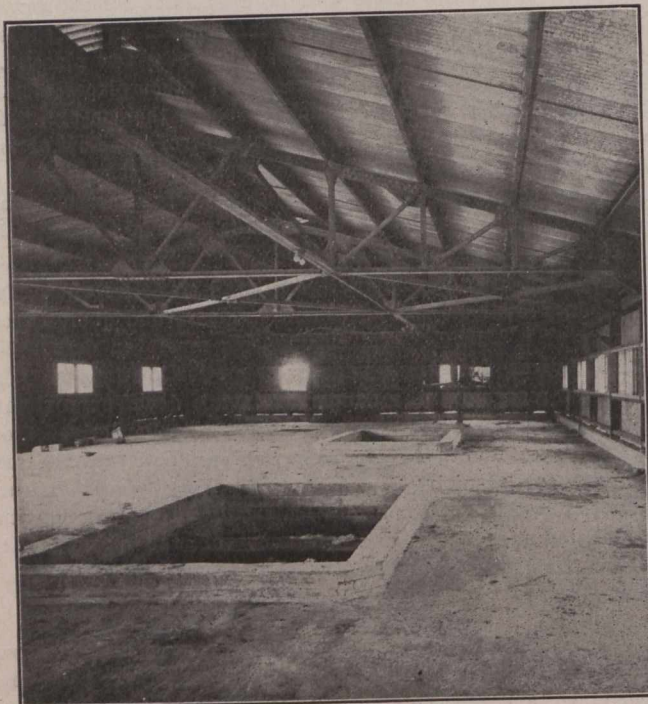
Mr. Yorston referred to the annual meeting of the American Peat Society at Ottawa on July 26, the interest taken in which by the industrial world being evidenced by three representatives of such being sent to attend the meeting. Hitherto we have thought little of our peat deposits, and the majority of our citizens speak frequently of them as "black swamps," and do not give more than a passing thought to their value and possibility of development in the near future. That great captains of industry think the subject important enough to

(Continued on Page 235.)

DISPOSAL OF CITY REFUSE.

The rapid growth in population and area of an ever-increasing number of our Canadian towns and cities is forcing the question of garbage disposal upon the attention of municipal engineers. A brief statement of the problem with an outline of general methods adopted for its solution may be of timely interest, particularly as we are able to illustrate by a concrete example the up-to-date method employed in one Canadian town of dealing with the question.

When a town has advanced sufficiently in population and public spirit to warrant a co-operative effort to handle and dispose of its household waste, the method of disposition invariably adopted in the first place is to gather all the refuse which would create a nuisance and be a menace to health at the individual residences and haul it all to one spot where it is dumped. It will be readily seen that this method, although so widely used, does not really dispose of the nuisance. It simply changes its location, and as the town extends, new dumping sites have to be found, with the expense of a longer haul in



View of Tipping Floor where Refuse is Discharged from Carts Direct into Bins.

order to place the danger at a more or less safe distance. It is questionable, however, whether there is any safe distance within cartage limits of a town. With our present-day knowledge of the causes and dissemination of disease, two minutes' thinking should convince anyone that to collect decaying and putrid vegetable and animal matter and spread it out in the open atmosphere is unsafe, unsanitary and unscientific. A visit to a refuse dump will usually show it to be a breeding place of flies and a source of offensive and unhealthy odors, which are carried by the wind for long distances. Flies from such a place cannot fail but to carry disease into any residences they may enter. The danger to public health, particularly in large cities, is further increased by the sorting over of the refuse by men and women who find articles which they consider of value. As a matter of fact, this practice is encouraged, even in such an enlightened city as Toronto, as is evidenced by a recent article by a medical health officer published in a Toronto journal, which describes and illustrates by photographs the methods of the sorters, stating further that the city actually derives a revenue from this source. The fact that

these articles have been in contact for hours, perhaps days, with the mixed refuse and garbage of the city, together with the fact that they were not likely to be free from filth themselves, emphasizes the risk of conveying this assortment back again into the city, undoubtedly as carriers of dirt and disease germs.

As an advance on the dumping method, reduction and incineration are the two systems most commonly in use. The reduction system, which consists of passing the garbage only, through a digestive process and extracting its oils and grease, is in use in a few cities in the United States. This system is, however, not likely to be adopted very generally for the reason that it is expensive to install and it is practically impossible to carry on the process without causing a nuisance by offensive odors. Further, it only deals with the garbage, and some other means must be provided for disposing of the remaining refuse, ashes and rubbish.

The most successful means of disposing of city refuse so far adopted is that of incineration. This system may be roughly divided into two classes distinguished by:

- (1) The low temperature furnace.
- (2) The high temperature furnace.

In the former class the refuse is burned on a large grate area at a slow rate of combustion, and as the refuse is usually of low calorific value, the temperature produced is not sufficiently high to completely destroy all the organic matter in the refuse and noxious, unburnt gases are produced. In the attempt to overcome this difficulty an auxiliary grate is often used on which coal, wood or other fuel is burned. This grate is placed between the furnace and the stack intercepting the unburnt gases and completing their combustion. In some of the low temperature plants fuel is also used to dry the refuse before it is placed on the main grate.

What is called the American style of crematories are on this system, but vary in details of construction. The results obtained from this class of furnace cannot be considered satisfactory. The use of auxiliary fuel considerably increases the cost of burning. The refuse really is not completely destroyed, and on account of the nuisance caused by unburnt gases the incinerator generally has to be situated a long way from the centre of collection. It is doubtful if this type of furnace is a sufficient advance over the dumping system to justify the expense of first cost and upkeep.

The high temperature system is the outcome of engineering practice in the British Isles, where the limited area and density of population, together with stringent sanitation laws, have greatly increased the importance of the problem and presented it before the engineering profession as worthy of careful study and the attainment of the most efficient means of garbage disposal. Practically every town or city of importance uses the high temperature method of disposing of its waste, and usually utilizes the products of combustion in some manner so as to reduce the cost of operation. The credit of being pioneers in the utilization of heat from the combustion of refuse cannot, however, be claimed by British engineers, as in Cairo, in Egypt, refuse has been employed for centuries to heat the Turkish baths in the city.

The first records we have of the early attempts at municipal incineration date about the year 1860, when the contractors in the London district, who had to collect and dispose of the refuse, found it impossible to secure land within a reasonable distance for dumping. They, therefore, turned their attention to burning the refuse. The original furnaces were very crude, and it was not until the year 1876 that Mr. Fryer, of Nottingham, brought out a furnace which fulfilled the requirements. The first destructor was erected about the year 1876 or 1877 at Water St., Manchester, and remained in use for some 26 or 27 years, if, in fact, it is not in use at present.

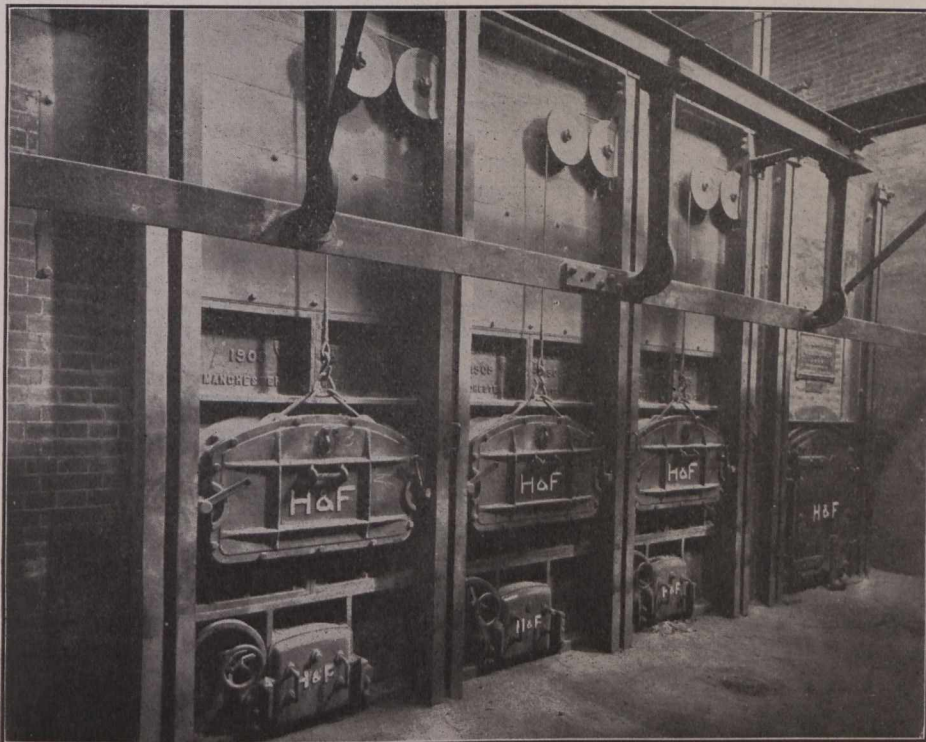
The next plant of importance following the Fryer was the Horsfall destructor, which was patented about 1887. In this plant means were adopted for supplying air to support combustion by means of a steam jet apparatus.

In 1894, a very distinct advance was made in destructor practice by the introduction of the Meldrum furnace by Messrs. Meldrum Bros., of Manchester. This was followed later by the Heenan furnace, built on much the same principle by Messrs. Heenan & Froude, also of Manchester. In 1901 the Sterling destructor was brought out and has been successfully installed in several cities.

The earlier plants were all operated by natural draught with consequent low temperatures and a rate of burning of about 15 to 20 lbs. per square foot of grate area per hour. An example of this type of furnace is that of the Montreal city incinerator, which was designed and erected some 25 years ago, following very largely the practice then in vogue in English destructors. This incinerator is still in use. It cannot, however, by any means, be described as modern, economical or

About the year 1894 the advantages of high temperature work became apparent to British engineers by the introduction of forced draught, which ensures a much higher burning capacity, and at the present time a rate of burning of 60 to 70 lbs. per square foot of grate area is quite common. Temperatures in the early style of furnace were probably about 800 degrees, whereas in the modern furnace, 2,000 degrees is ordinary practice, with the result that this heat can be utilized for the production of steam, it being quite common practice to evaporate $1\frac{1}{2}$ to 2 lbs. of water from and at 212 degrees per pound of refuse consumed. The prime object of a refuse destructor is, of course, the thorough destruction of the refuse. The high temperature system absolutely ensures this, as with the temperature maintained it is physically impossible for noxious or unconsumed gases to pass from the stack. The clinker withdrawn from the furnace is perfectly hard and contains no trace of organic matter.

The high temperature furnaces may also be broadly divided into two classes:



Three Cell Destructor and Combustion Chamber Clinking Floor.

efficient, nor is it capable of dealing with mixed refuse in the state in which it is collected. The refuse after being brought in is passed through a revolving screen, and any ashes or particles of organic matter which will pass through its 1 inch mesh is again loaded up and carted to a dumping ground some distance away. As this material constitutes about 30 per cent. of the total brought in, and another 30 per cent. is taken out of the furnace as ashes, it means that at least 50 to 60 per cent. of the refuse brought to the incinerator has to be carted away again. The slow rate of burning is quite perceptible, and the incompleteness of the combustion is evidenced by the amount of partly consumed material which is withdrawn from the cells; the partly burnt paper intercepted by the screen at base of stack and the dense volume of smoke emitted. The offensive nature of the gases emitted by the plant are distinctly and unpleasantly perceptible to those on the lee side. No attempt is made to utilize the heat generated. In fact, such a course would be impossible with this old style of furnace.

- (1) The isolated cell system.
- (2) The continuous furnace system with separate ashpits only.

In the former, each cell and ashpit is entirely independent of its neighbor. In the latter the grates of each cell are practically continuous, being divided simply by a bar for the separation of the clinker. In this way the heat generated from each grate is of mutual assistance to the fires on the adjoining grates. This is of great importance during the operation of cleaning, as while one grate is being cleaned the combined heat from the other cells is sufficient to maintain the temperature of the furnace to the requisite point.

Another advantage claimed for the latter system is the very complete mixing of the gases. An undulating form of arch is used in some types of destructor to produce eddies in the furnace which mix the gases so thoroughly that complete combustion is secured.

High temperature furnaces are now in use in the principal countries of Europe. Plants of British design are installed and in successful operation in Australia, New Zealand, South Africa, Strait Settlements, Egypt, France, Russia, Holland, Belgium, United States, South America. Within the last three months the city of St. Petersburg has decided on the installation of a large plant of the Heenan type, this being the first of six which are to be installed in that city.

This continent is woefully behind in this respect. There are admittedly a very large proportion of failures recorded in plants erected in North America, principally for the reason of incorrect design and consequent inability to maintain, or even reach, the requisite high temperature. So far as our present information goes the following are the only high temperature plants existing or in course of erection in the United States or Canada:

Year.	Place.	Type.	Purposes for which Steam is Used.	Make.	Capacity.
1906	Westmount, No. 1	Continuous Grate.....	Generating electricity.	Meldrum	50 tons.
1906	Vancouver	Continuous Grate.....	Generating electricity and heating.	Heenan.	50 tons.
1907	Borough of Richmond, N. Y.	Continuous Grate.....	Operating clinker plant.	Heenan	50 tons.
1907	Seattle	Continuous Grate.....	Various municipal purposes.	Meldrum	50 tons.
1909	Westmount, No. 2	Continuous Grate.....	Generating electricity.	Heenan	50 tons.
1909	Buffalo	Continuous Grate.....	Sewage pumping.	Heenan	60 tons.
1909	Milwaukee	Continuous Grate.....	Sewage pumping.	Heenan	350 tons.
1910	Montgomery, Fla.	Continuous Grate.....	Municipal purposes.	Heenan	50 tons.

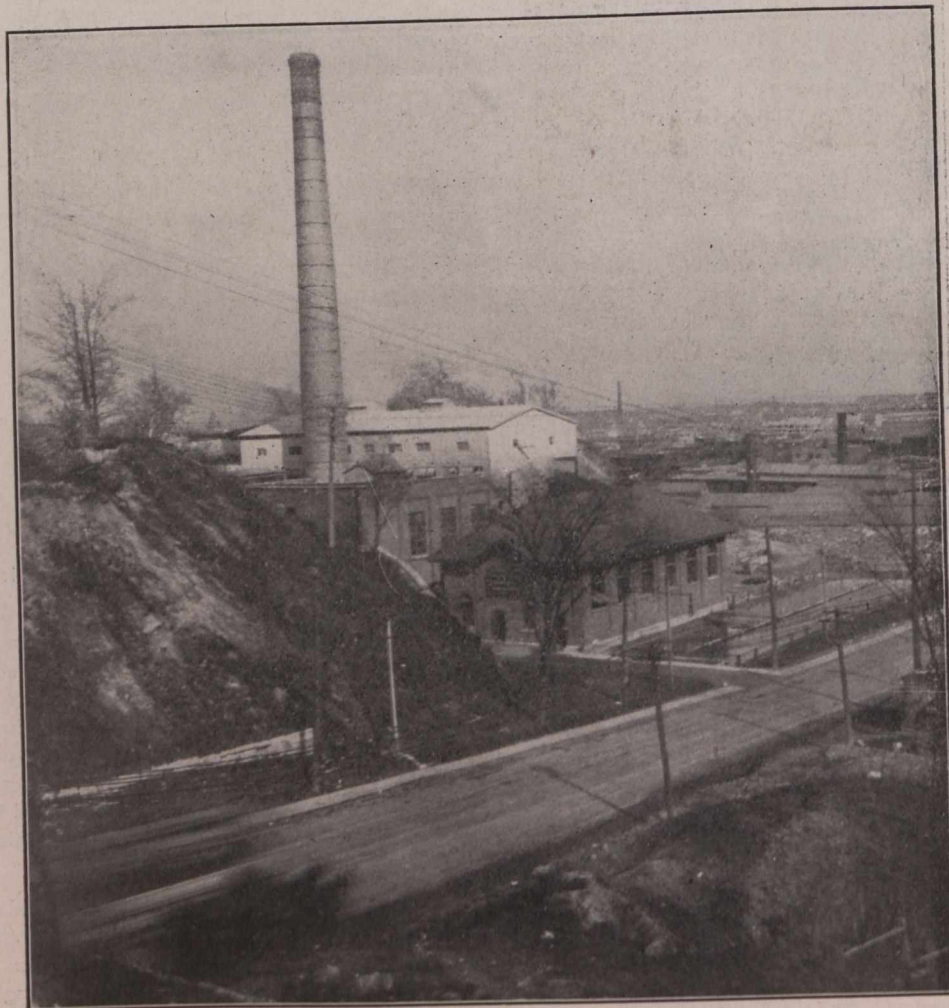
Canadian towns and cities from whom this information is being obtained.

In order to give a definite and detailed description of the process of incineration in a continuous grate, high temperature destructor installed by the city of Westmount, as this plant is typical of the most recent British engineering practice in the destruction of refuse. The Westmount plant had its inception in the year 1904, when the problem of devising means of disposing of their refuse had to be faced. Messrs. Ross & Holgate, acting as consulting engineers to the city of Westmount, in a report submitted that:

(1) The garbage question has become acute in your town, as no dumping space can be provided within your own boundaries or those of neighboring municipalities.

(2) It is recognized in view of the above that the city

We hope to supplement this later with more complete information of the methods actually in use in a large number of garbage will have to be burned so as to effectually destroy its noxious qualities.

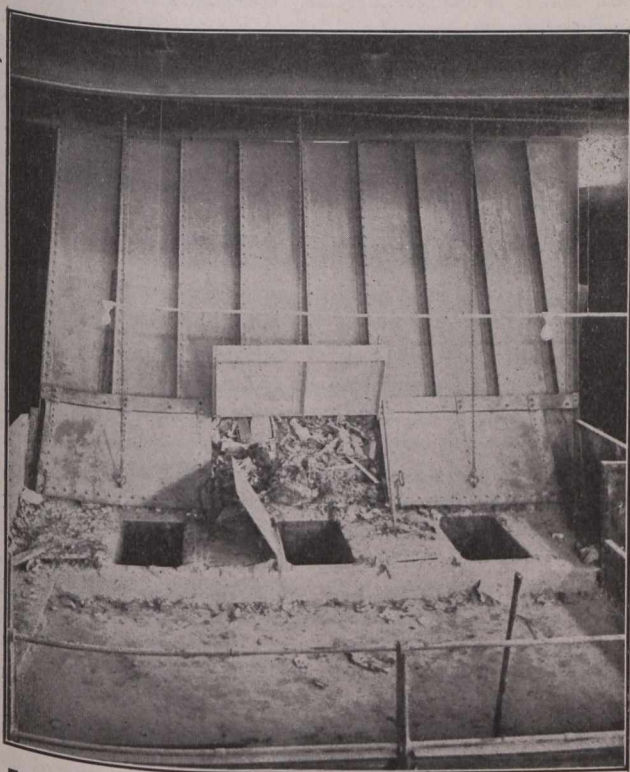


General View Westmount Destructor Plant and Power House.

(3) It is also recognized from experience with English destructors that municipal garbage has a distinct heat value which can be applied to the raising of steam for power purposes.

(4) It is recognized that the existing rates for light and power in Westmount are altogether too high and could be reduced by a municipal lighting plant which would utilize the heat value of the garbage for steam raising.

By the end of 1906 a combined electric lighting and incineration plant were in operation and with a success beyond expectations. In the year 1909, on account of increase in population, it became necessary to increase the capacity of the destructor and power station. The original destructor installed was a three-cell, continuous grate, Meldrum furnace, of 50 tons capacity per 24 hours. The second unit installed during the past winter is a 50-ton, three-cell, continuous grate, Heenan patent furnace, designed and erected by Messrs. Heenan & Froude, of Manchester, England. The design of this furnace,



Foot of Bin Showing Opening into Charging Container.

while following generally that of the furnaces used in the British Isles, has been modified to some extent to suit the different conditions existing in this country caused by the difference in seasons, different composition of garbage and refuse to be dealt with. The two furnaces are placed within a specially designed incinerator building. The plant is situated on the Glen Road, in Westmount, at the point where the land level changes abruptly by some 35 or 40 feet. The site is peculiarly advantageous for a destructor plant, as will be seen by the general view. This photograph was taken from the Canadian Pacific Railway tracks on the higher level. The power plant building in the foreground and boiler house and incinerator building in the background, are all on the lower level; it was not, therefore, necessary to provide an inclined roadway to the top of the furnace. The refuse collecting carts drive in from St. Catherine Street by a road on the higher level without any incline to the tipping floor.

The incinerator building is constructed throughout of concrete. The roof is flat and constitutes the tipping platform, and is enclosed by a steel frame and corrugated iron shed, which is

shown immediately behind the chimney stack in the general view. An interior view of this shed and tipping platform is shown. The refuse is dumped direct from the collection carts into two large bins through the openings in tipping platform shown in photograph, one being for each furnace and having a capacity of about 40 cubic yards each. Inside the building these bins slope toward the charging platform, which is situated directly over the furnace. These bins are constructed entirely of iron and are equipped with doors so that when refuse is being dumped no dust enters the incinerator building. A view is shown of the foot of the bin and charging platform. It will be seen that one door of the bin is open and three cells of the furnace. The refuse is raked from the bin into the charging containers, the open doors of which are shown. When the containers are filled, the top door is closed and a bottom door opening immediately into the furnace is opened, the contents of each container being almost instantaneously deposited into the furnace. The operation of charging and clinkering is performed in a regular routine, and in such a way that a mean even temperature is maintained in the furnace.

A front view of the incinerator is shown. The three large doors are used for withdrawing the clinker from the respective cells. This clinker is loaded on a car which travels on the overhead single rail shown, and is conveyed outside to the clinker yard. Below the clinker doors are shown the small doors to the independent ashpits, and to the left of each door is the valve regulating the hot air supply to each grate. The products of combustion from the three cells pass through one opening into a common combustion chamber, the door of which is shown at the extreme right of the illustration. In this chamber the gases are completely intermingled and are thoroughly burned before coming in contact with the cold surface of the boiler. An essential feature for the successful operation of a refuse destructor is that the temperature in this combustion chamber shall be maintained above 1,400 degrees F., thus effectually destroying and consuming all noxious gases and absolutely ensuring the operation of the plant without nuisance. A proof that this is accomplished in the case of Westmount is the proximity of residences on the lower level as shown in the general view of the plant, and the still closer proximity of fine residences on the higher level. The authorities state that no complaint has ever been made, nor has any perceptible odor ever been detected from the gases from the chimney.

The combustion chamber also performs the office of a dust collector, the fine dust being deposited in the bottom of the chamber. This dust, while not utilized at Westmount, is in some European plants used for the purpose of manufacturing a disinfectant powder. The combustion chamber is equipped with a large door so that it may be used for the cremation of carcasses. It is only within the past few weeks, however, that use has been made of this facility. Hitherto all carcasses have been disposed of by special contract. The Westmount authorities now find that they can more effectually dispose of the carcasses in their own incinerator at considerably less cost. In future, therefore, the combustion chamber of the incinerator will be used for this purpose.

After leaving the combustion chamber the gases pass under a Babcock & Wilcox water tube boiler rated at 200 horse power, the steam from this boiler being utilized in the electric lighting plant. After leaving the boiler, the gases pass through a regenerator or air heater. This, as its name implies, is used to heat the air for combustion at the expense of the waste heat in the gases. After passing through the regenerator, the gases enter the main flue and pass up the stack. As an indication of the extent to which the heat is utilized, it will be seen by referring to the data given later that while the average temperature in the combustion chamber is 2,000 degrees, the temperature after leaving the boiler is reduced to 652 degrees, this being still further reduced after passing through the regenera-

tor to about 530 degrees. On the other hand, the air passes into the regenerator at a temperature of about 60 degrees, and passes out and forward under the grates at a temperature of about 240 to 260 degrees. The supply of air is maintained by a forced draught system. A specially constructed fan directly driven by a totally enclosed vertical high speed engine withdraws the air by a duct from the upper part of the building, thus incidentally providing a very effective means of ventilation. The fan passes this air under pressure through the regenerator tubes and forward by underground flue to the respective ashpits under each grate. At this point the air supply is regulated by the valve already referred to.

The complete plant is designed in such a way that it is very simple to operate. Temperatures are maintained without difficulty. Charging and clinking can be carried out by a very small force of men. As a matter of fact, the Westmount plant is run by three men, one charge hand and two assistants per shift of 12 hours.

The experience with the destructors here has been perfectly satisfactory and has demonstrated beyond doubt that under proper engineering conditions in the design, erection and supervision of the plant, this system of refuse disposal can be operated quite as satisfactorily on this continent as in Europe and other countries.

Before giving data of the results obtained with the Westmount incinerator, the local conditions and class of refuse dealt with should be referred to. The city of Westmount is almost purely a residential district. Its population is roughly 14,000. It occupies an area of 925 acres, thus giving a population of 15 people per acre.

As in most Canadian cities, the winter collections are of a widely different character to that of the summer. In winter, about 50 per cent. by weight of the collection consists of hard coal ashes. The remaining 50 per cent. consists of household refuse, bottles, cans, etc. In the summer months there are practically no ashes and the garbage itself is of a somewhat different character, containing more paper and light combustible matter, and also a large quantity of fruit and vegetable matter. In the winter the average number of loads collected per day is approximately 45, and in the summer 35. This gives the proportion by volume, but it is far from representing the proportion by weight. It is probable that one cubic yard of winter refuse is at least 50 per cent. heavier than one cubic yard of the summer refuse. The ashes in the winter months are as far as possible collected separately, and being free from organic matter, it is not necessary for sanitary purposes to pass them through the furnace. As, however, they have a fairly high calorific value, the Westmount authorities find the ashes particularly useful for steam raising purposes, and they are, therefore, passed through the furnace with the garbage. Tests carried out during the past winter have shown that these ashes contain on an average two parts of fine ash capable of passing through a 3-16 inch screen to one part of larger size, consisting mostly of half burnt coal. The total quantity of refuse dealt with at the incinerator with the original destructor during the year 1909 was 14,031 tons. The operating cost of destroying the refuse over and above the revenue credited for steam raising was six cents per ton. The fixed charges, consisting of interest, sinking fund, depreciation, etc., were 40 cents per ton, making the total net cost of destroying the refuse 46 cents per ton. During the present year, 1910, the new Heenan unit is in operation and still more satisfactory results are anticipated. In the winter months the plant is operated for 24 hours, divided into two shifts with three men per shift. In the summer months the refuse is disposed of in one shift, the actual time taken to burn the refuse being only about six hours.

In addition to the refuse fired boiler the boiler house contains three coal fired boilers rated at 200 horse power each, which are in operation throughout the year, as the town does

not furnish sufficient refuse to supply all the power required. A rough indication of the economy effected by using the refuse as fuel is found in the fact that in the winter time the coal bill is reduced from one-third to one-half when the refuse fired boiler is in operation. In the summer time, during the hours the refuse is being consumed, its boiler carries one-third of the load of the station. If more refuse were available, it seems apparent that sufficient credit could be obtained for steam raising to cover the whole operating cost of refuse destruction.

In addition to the revenue from the steam, the clinker product is a valuable asset. Roughly, 30 per cent. of the refuse comes out of the furnace as a perfectly hard, innocuous clinker, free from any organic matter. In the year 1909, about 5,000 loads of clinker were produced, 3,000 being used by the road department in concrete and road work, and the remaining 2,000 loads being sold to contractors. This clinker is specially valuable for use in concrete floors on account of its strength and lightness. It is also particularly useful for filter beds for the reason that it is unaffected by any chemical action produced by the sewage.

The Heenan destructor was erected during the winter months under the direct charge of a member of the engineering staff of Messrs. Heenan & Froude, with the co-operation of their Canadian agents, Messrs. Laurie & Lamb, engineers, Montreal. It was completed in the month of January last, and in the month of March tests were carried out by the city to ascertain if the contractors had fulfilled their guarantees. The guarantees given by Messrs. Heenan & Froude were as follows:

(1) That the plant shall be capable of burning to a hard, innocuous clinker, 50 tons of the refuse of the city of Westmount per day of 24 hours, or 20 tons in 10 hours.

(2) That the combustion of the refuse shall be complete and free from nuisance, and that no odors or noxious gases shall be emitted from the chimney.

(3) That the temperature in the combustion chamber in normal working with refuse of average quality shall not fall below 1,500 degrees F., and that the average temperature will be from 1,700 degrees to 1,800 degrees F.

(4) That with refuse of average quality an evaporation of 1¼ lbs. per lb. of refuse from and at 212 degrees F. shall be obtained.

The tests were carried out under the direct supervision of Mr. F. B. Brown, of Messrs. Ross & Holgate, consulting engineers, Montreal, and Mr. Geo. Thompson, superintendent of the Westmount light and power department, the contractors, Messrs. Heenan & Froude, being also represented. The results of tests are given in tabulated form below.

In Test No. 1, the refuse contained an abnormal percentage of anthracite ashes, and it was, therefore, decided that this should not be considered as a guarantee test of capacity. It will be noticed that the percentage of clinker and dust is nearly 45 per cent., and it is probable that it was even higher than this on account of the difficulty experienced in determining the exact amount of dust. During Test No. 1, the incinerator boiler carried the whole of the day load of about 120 K.W., and during a considerable portion of the time the boiler was blowing off. It will be noticed that the water evaporated per pound of refuse burned from and at 212 degrees F. is very high and also the number of kilowatt hours per ton of fuel. This is probably attributable to the fixed carbon in the ashes. In Test No. 2 the refuse was admitted to be of a more representative character. It contained considerably less ash than in previous test with a consequent reduction of water evaporated per pound of refuse, but with an increase in the rate of burning. During this test an artificial load supplemented the ordinary day load in order to prevent the boiler blowing off. Comparing the tests with the guarantees, it will be noticed that in Test No. 2, where the refuse was of average composition, the rate of burning per 24

hours was 50.8 gross tons, against a guarantee of 50 tons. The average combustion chamber temperature in this test was 2,202 degrees, against a guarantee of 1,700 to 1,800 degrees. The minimum temperature was 2,000 degrees, against a guarantee of 1,500 degrees. The water evaporated per pound of refuse from and at 212 degrees, was 1.48 lbs., against a guarantee of 1.25 lbs.

It will be of interest to note that assuming as a conservative estimate that 8 to 10 lbs. of water can be evaporated by one pound of coal, the evaporation obtained with the garbage shows that ordinary municipal waste has a heat value corresponding to one-sixth or one-seventh that of average coal.

The general engineering features and layouts of the West-mount plant were designed by and carried out under the supervision of Messrs. Ross & Holgate, consulting engineers, Montreal, who have devoted much attention to the study of municipal refuse disposal. Much credit for the successful operation of the plant must also be given Mr. Geo. W. Thompson, the general superintendent of the light and power department, who has had charge not only of the electric department, but also of the incineration department since the year 1906. There are few men in Canada who have had so much practical experience in modern methods of garbage disposal as Mr. Thompson.

Date.	Test No. 1.	Test No. 2.
Duration.	March 22nd, 1910.	March 29th, 1910.
	9½ hours.	6¾ hours.

Details of Fuel.

Quantity handled and burned—		
Mixed refuse, garbage, etc.	10575 lbs. = 36.9%	15790 lbs. = 51%
Mixed ashes	18085 lbs. = 63.1%	15590 lbs. = 49%
Total charged into furnace	28600 lbs. = 100%	31380 lbs. = 100%
Residuum, with % to refuse charged—		
Clinker.	9805 lbs. = 34.2%	6270 lbs. = 20%..
Dust.	3000 lbs. = 10.5%	1000 lbs. = 3.2%
Total.	12805 lbs. = 44.7%	7270 lbs. = 23.2%
Rate of burning per hour	3016.8 lbs.	4704 lbs.
Rate of burning per square foot of grate area per hour	40.2 lbs.	62.7 lbs.
Equivalent rate of burning per 24 hours	72403.2 lbs.	112896 lbs.
	30.17 gross tons	50.8 gross tons

Details of Water and Steam.

Total water evaporated	49000 lbs.	37583 lbs.
Water evaporated per hour	5158 lbs.	5633 lbs.
Water evaporated per pound of refuse burned	1.71 lbs.	1.20 lbs.
Average boiler pressure (gauge)	122.6 lbs.	118 lbs.
Average temperature of steam	601.6 deg. F.	623 deg. F.
Average temperature of feed water	170.4 deg. F.	170 deg. F.
Factor of evaporation	1.235	1.234
Water evaporated per lb. of refuse burned from and at 212 degrees.	2.11 lbs.	1.48 lbs.
Average combustion chamber temperature	1973 deg. F.	2202 deg. F.
Maximum combustion chamber temperature	2084 deg. F.	2500 deg. F.
Minimum combustion chamber temperature	1800 deg. F.	2000 deg. F.
Average temperature of gases after boiler and before regenerator	648 deg. F.	652 deg. F.
Average temperature of gases after regenerator	481 deg. F.	536 deg. F.
Chimney draught	⅝ inch	⅝ inch
Average temperature of air before regenerator	60 deg. F.	66 deg. F.
Average temperature of air after regenerator	237 deg. F.	260 deg. F.
Average air pressure after regenerator	3½ inch	4 inch
Speed of fan	350 r. p. m.	330 r. p. m.

Details of Electrical Figures.

Total kilowatt hours generated	1180	920
Average kilowatt per hour	124	138
Maximum kilowatt	150	225
Kilowatt hours per ton (2240) or refuse burnt	91.8	66
Kilowatt hours per ton (2240 lbs.) of refuse burnt on basis of 30 lbs. steam per kilowatt hour	127	89

NOVA SCOTIA SOCIETY OF ENGINEERS.

(Continued from Page 229.)

send experts to look into the question and follow its development should make us sit up and take notice. Indications would seem to show these natural gifts will gradually assume greater values.

Already the government of the province has proved itself alive to the necessities of the day and given valuable assistance to the fishing, lumbering and mining industries, and also to agriculture, and he had no doubt the progressive spirit will con-

tinue to develop and the government will yet see it is a wise move to encourage any further development, particularly in mining and manufacturing by offering every facility for the profitable prosecution of different enterprises. In the past the province has not been most generous in its assistance to railway construction. It would be only carrying this a little further to take a step which will increase the value of the railways by making traffic for them. Mr. Yorston did not wish to be understood as advocating the government granting indiscriminate assistance. The country is comparatively new, and, consequently, there is not yet enough wealth in the province

to carry out development, so that the government could afford to step in and expend such sums as would insure creation of **new industries or enlargement of old ones**; the creation of such conditions as would contribute to the success of an undertaking by permitting the highest development.

Artificial Storage.

It must be conceded our streams have a deficiency of storage capacity, and to permit of the highest development artificial storage must be created on the watershed by placing dams across the stream, where possible and create reservoirs to hold back part of the flood flow. In many cases it will be possible to divert small streams from one watershed to another. Both these operations entail considerable outlay of capital. In such circumstances there would seem to be a legitimate field for government assistance, and one which should bring indirect returns sufficient to reimburse for any outlay made.

"Whether or not we are all of one mind as to how our water power problems should be solved, as Nova Scotians we should be a unit as regards anything that makes for the betterment of our native province. Already our progressive spirit has shown itself in much of our recent legislation, and in at least one or two regards we lead our sister provinces of the Dominion of Canada. To bring the country to its highest development it is absolutely necessary that all Nova Scotians should become imbued with an abiding faith in their native province and its resources. Not a passive faith such as has, perhaps, marked us in the past, but a faith in our future prospects so intense as to dim the most enticing allurements from abroad. When we have all realized that in our native province we possess as goodly a heritage as could be allotted to mankind, and when we shall all have the courage of our convictions and put our energies and cash into industries and development at home instead of looking for investments abroad, there will come our full measure of prosperity, and who shall know the limit of it?"

Recent Development in Engineering Education.

F. H. Sexton, Director of Technical Education, Nova Scotia, was the second speaker at this morning's session.

The principal theme of Mr. Sexton's paper was to show the recent development in engineering education on the lines of the extension of the university work, to people who were not reached by the college before, also of the closer correlation between active industry and the college in some special case to-day. In part, Mr. Sexton said:

The colleges are ministering to the people outside the colleges by short courses, evening courses, and correspondence courses.

Cooper Union, in New York, has turned out hundreds of men who compare favorably with those graduating from full engineering courses. Cooper Union offers its work in the evening for the most part in electrical, mechanical, structural and chemical engineering. Men attend Cooper Union for five nights a week and obtain a degree after about four or five years of study.

The Polytechnic Institute, of Brooklyn, has recently offered nearly all of its day courses in engineering to students in the evening, and a degree may be obtained after following the same course as is prescribed for the day students.

The University of Chicago and the University of Wisconsin have established correspondence courses. The University of Chicago offers more than 300. It is possible in these colleges to pass the whole of the first two years' courses by correspondence alone.

The University of Cincinnati has instituted a very notable advance in engineering courses. Under this plan the student

spends one week at the university, and the next week in one of the great shops in Cincinnati. He has a mate who works in the shop while the first boy is in college, and who is in college while the first boy is in the shop. Thus the shop is not disorganized nor is the college. The boys earn wages from 10c. to 21c. an hour during the six years of the course. They earn an amount averaging \$300 per year for this period while the actual college expenses for the same time average \$75 a year only.

This scheme has everything to commend it, because the boy is learning his practice with his theory and is a much better equipped engineer at the end of the course than his brother who has acquired only the theory in the four years' course.

The Technical College in Halifax is striving as much as possible to serve the interests of applied science training in the province. It would be hard to establish co-operative courses in connection with it at present, because there are no great electrical or machine manufacturing shops in Halifax at present. These may confidently be expected in a few years' time with the industrial development of the city which is bound to come.

Correspondence Courses.

The Technical College is planning to follow the worthy example of the University of Chicago and the University of Wisconsin in the establishment of correspondence courses. These courses will be established as time, money and opportunity permit, and will give students in remote districts a chance to apply the knowledge that they would not otherwise have. The correspondence course will reach the students who cannot be reached by evening classes or in any other way.

The Technical College is offering short courses this year in land surveying and highway construction. These courses will be given in the winter months, when there is not much actual work being done in either line. The land surveying course will be especially adapted for those who wish to qualify for land surveyors under the new Act for Surveyors, which has recently been passed. The course in highway construction is planned for those who are interested in the construction of rural highways, and leaves theory in the background as much as possible and considers the practical side of road building. The topics to be treated are the location of roads, road building, road maintenance, road machinery, culverts and small bridges. The cost of all the operations is to be kept in the foreground as much as possible.

Other short courses for coal mining officials and power house superintendents are to be amended later.

The Technical College enjoys one distinction that Nova Scotians should be proud of. It is the only college that is trying to carry the necessary education to the mechanic by a system of evening schools. The evening school method of instruction is superior wherever it can be applied. Last year there were nearly 1,500 students in the coal mining school, engineering schools, and schools for mechanics that were scattered over Nova Scotia.

The Technical College has been running only one year and as yet has not accomplished much in the way of industrial research. In connection with the newly discovered tungsten-scheelite, the college has discovered a method of extracting commercially the mineral from the rock and partially refining it for the market. The college is installing apparatus for testing building materials, cement, etc., and intends to undertake research which will be of value to Nova Scotian industrial activities.

The Technical College is now trying to build up such a name for itself that it will attract the students outside the limits of the province to itself, but its chief aim is simply to be of service to the young men of Nova Scotia and to the best industrial interests of Nova Scotia.

THE ENGINEERS' LIBRARY

Supplement to THE CANADIAN ENGINEER.

62 Church St., Toronto, Ont.

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NEW BOOKS.

No successful engineer is unwilling to learn from the experiences of masters in the field which has for him an interest. No engineer is so sure of his fundamental theory that he is not pleased to review it when presented to him from an interesting point of view. It must be a knowledge of these facts that encourages authors to continue producing new books on familiar subjects.

This autumn will see new books on aviation, on the gyroscope and the dozen other matters that, although at the present moment are novelties and playthings, may in the future have an engineering and a commercial value, but, in addition to these publications on subjects that are comparatively new, we find many more books treating of subjects that have been written about time and again. Electricity, agriculture, prime mover, engineering, chemistry, cost and cost-keeping and the engineering subjects from A to Z.

Many good books are leaving the press this autumn, perhaps more useful books than is usual for the authors are grasping that principle of the art of teaching which is so important namely, that in presenting a subject, to present it successfully, you must base a new conception upon old and familiar ones.

Among the new books from The Canadian Engineer press this fall will be "Applied Statics," by T. R. Loudon, B.A.Sc., lecturer in Statics, Faculty of Applied Science, University of Toronto. A number of practical problems accompany the text, and Mr. Loudon has succeeded in presenting his subject in such a practical manner as to make it interesting. Uniform in size with this publication will be one entitled "Elementary Electrical Engineering," by Professor L. W. Gill, Professor of Electricity in Queen's University. Professor Gill's success as a college lecturer is well known, and his series of articles contributed to The Canadian Engineer has attracted so much attention that it has been decided to publish them in book form. It is expected that these two publications will be ready in about a month.

BOOK REVIEWS.

The Building Estimator.—By Wm. Arthur. Published by the David Williams Co., of 14 Park Place, New York, N.Y. Size, 4 x 6, pp. 500. Price, \$2.00.
This book is a practical guide to estimating the cost

of labor and material in building construction. Various practical examples of work are presented in detail, with the labor figured in hours and the quantity of material specified.

This will be a very convenient handbook for architects, contractors, engineers, superintendents and draughtsmen.

So many matters are taken up and dealt with fully that it is impossible to enumerate, but it might be pointed out that it contains figures and labor required for excavation work, piling, concrete work, brickwork, iron, steel and carpentry, tin and galvanized iron, plaster and mill work, painting and glazing.

In the detailed estimating, twenty-nine different sections are devoted to this number of the different branches of construction work. The following example, chosen at random, will indicate the method of presenting the information:—

Mortar for Average Rubble.

"One and three-quarter barrels Portland and one yard sand to 100 cubic feet of finished wall.

One and one-half barrels good lime and one yard sand to 100 cubic feet of finished wall.

Water.—For making rubble mortar the Omaha Waterworks charge 8 cents per cubic yard for water; for tempering only, 3 cents. The meter rate is 35 cents per 1,000 gallons, which is far cheaper—say, one-third the price. The Chicago rate is 6 cents for 128 cubic feet.

Labor.—A mason and laborer will lay three cubic yards of ordinary rubble in a four-hour day, and on some kinds of walls below ground, five to six. One laborer can attend two masons if everything is handy, but if wheeling is required, it takes about man to man. In the stone-cutting yard two men can attend ten cutters.

Example.—On a building recently erected 500 cubic yards of rubble cost about \$1,000 for labor. Most of the stones had to be handled with a derrick, and, although the walls were thick and straight, this cost probably 25 cents extra. On another building with 120 yards the walls were short and the cost ran to \$2.50, but extra time was required on the angles. Good time can be made with a derrick if all the stones are large, but if work is so far away from ground that large and small have to be handled this way it costs more. A fair price for 18 to 20 inches ordinary work is \$1.50. Thick, straight walls can be done for less. The labor is not exactly in proportion to the number of cubic yards, as a 16-inch wall requires two faces just as a 24-inch does; and the filling goes in faster than the outside work. Scaffolding has sometimes to be allowed if walls are high.

Cutting.—In eight hours one man will cut and square about 40 cubic feet of large limestone blocks for bridge and pier work and 25 of small blocks. Sandstone costs more to cut than limestone as it wears out the tools sooner. Unless very soft it is worth 10 per cent. more to square up. There is no sandstone in Bedford, Ind.; "Bedford" is a limestone."

The Canadian Annual Review, 1909.—By J. Castell Hopkins, F.S.S. Published by the Annual Review Publishing Co., 2 College Street, Toronto. Size, 6 x 9, pp. 700. Price, \$3.50.

This is the ninth volume of the review of Canadian public affairs, and covers in detail the most important events of the year 1909 which refer to Canada.

The contents are divided into ten chapters, the chapters being as follows: Relations with the Empire; Dominion Public Affairs; Provincial Affairs in each of the several Provinces; Transportation Interests; Foreign Relations of Canada and Finance and Miscellaneous Affairs.

The volume is carefully indexed and cross-indexed in such a way as to make it possible to find quickly almost any subject treated of in the volume. One interesting section of the review is devoted to Canadian books of the year. Written in a clear and concise manner and prepared with great care, it will prove a valuable work of reference to those interested in Canadian affairs.

Estimating Data.—By the Builders' Auxiliary Co., 4 Magog Street, Sherbrooke, Que. Size, 3 x 5, pp. 70. Price, \$1.00.

This volume has been compiled from a large number of actual contracts of varying size under varying conditions, and will be found of great value to the architect, contractor, carpenter, mason, plumber, tinsmith, painter, electrician, etc.

The estimate of the quantity of material and the hours of labor that would be spent on erection or putting in place is given. Prices are not often given, as they vary so with locality that they are of little value. The handbook is carefully indexed so that one can readily find the particular estimate he may be looking for. As an example of the manner in which the information is prepared and presented we quote their estimate on plastering work:—

Plastering.

“Allow 17 bunches of wood laths for each 100 square yards of plaster (1,700 laths).

For labor on laths, allow one man one day for each 18 bunches (1,800 laths).

Allow 7 pounds of nails for every 1,000 laths.

For asbestic plaster, allow $1\frac{1}{2}$ barrels of lime, 1 ton of asbestos and 7 pounds of hair for each 100 square yards of brown coat for each coat. For ordinary plaster (sand and lime) allow 2 barrels of lime, $\frac{3}{4}$ cubic yard of sand and 7 pounds of hair for each brown coat for each 100 square yards.

For putty coat, allow $\frac{3}{4}$ barrel of lime, 50 pounds of asbestos finish or 1 bushel of sand and $\frac{1}{3}$ barrel of plaster of Paris for each 100 square yards.

One ton of pulp plaster will cover 100 square yards, one coat, not over $\frac{1}{4}$ -inch thick.

Allow two plasterers and one helper one day for 50 square yards of three-coat work.

Allow two plasterers and one helper one day for 80 square yards of two-coat work.

For ordinary plaster cornice, including corners, allow 40 lineal feet per day per man.

The above is for first-class work. Green skim can be done for 15 per cent. less.

The above figures refer to plastering on wood laths. For plastering on metal laths, add 75 per cent. to the above quantities of material.

Where metallic lath is used, deduct 25 per cent. from the number of square yards per day given for man and helper.

One carpenter will put up 300 lineal feet per day of wood corner beads, first-class workmanship, or 250 lineal feet of metal corner beads.

For outside plastering on metal laths allow 3 barrels of cement and $\frac{3}{4}$ load of sand for each coat of 100 square yards, $\frac{1}{2}$ -inch in thickness.

For outside first coat where one part lime putty, one part cement and three parts sand are used, the quantities for 100 square yards will be $\frac{3}{4}$ barrel lime, 1 barrel of cement and $\frac{3}{4}$ cubic yard of sand.

For labor on outside plastering, allow one man and one helper one day for 50 square yards of two-coat work.

Pebble dash or stucco work costs double the price of ordinary outside cement plaster.

The only extra material required is screened gravel, but the time of application increases the cost of the labor.

On interior ornamental plaster, such as is usually planted upon the putty coat, the labor will be found to cost just about as much as the material.

One carpenter will build storage bin for 1,000 square yards of plaster in one day.

Two men, with materials handy, will mix the mortar for 1,000 square yards of plaster, one coat, in three days.

One man will mix lime putty for 1,000 square yards of putty coat in three days. A storage bin, twelve feet square and three feet deep, will hold comfortably mortar for 1,000 square yards of plaster, one coat. Three hundred and fifty feet board measure of lumber will build such a bin, and will require ten pounds of nails.”

Practical Testing of Gas and Gas Meters C. H. Stone, B.S., M.S.; x + 337 pages, 6 in. x 9 in.; cloth, \$3.50; John Wiley & Sons.

To the average man it will be somewhat of a surprise that a book of its size can be written on the above subject, especially when it is noted that very little space is devoted to the manufacture of gas. To the gas works engineer and chemist the work should prove a valuable compilation of processes and forms of apparatus which may save much tiresome searching of journals and textbooks.

The work is divided into four parts dealing with photometry, chemical tests, calorimetry and testing of meters. An appendix contains many tables of value in obtaining results from the methods of testing outlined in the book.

The present day requirements in photometry and the results of chemical tests are of less general interest than the fact that calorimetry seems to be destined to be of greater importance. Since from 75 to 90 per cent. of all gas burned is consumed in Welsbach burners and heating appliances, the heating value of the gas is the factor to be dealt with; and candle power tests alone benefit those using flat-flame burners and may prove a real injury to consumers using Welsbach burners. Uniformity of pressure is of prime importance and high pressures seem to result in waste of gas while low pressures are a source of continual annoyance. It would appear, however, that any waste accompanying high pressures is due to the fact that the average consumer fails to take advantage of the means provided for adjustment. The author says that so long as flat-flame burners are in use, and the consumer persists in opening wide the gascock, so long will there be dispute and hard feeling between the public and the gas company.

The Testing of Meters is taken up in the fourth part. The standards of reference are clearly illustrated and explained and the methods of testing are taken up in detail. It will be interesting to the average man to know that the meter he has looked on as a traditional prevaricator has been shown by tests in this country, and in Britain and the United States, to be a model of veracity; the burden of evidence seems to prove conclusively that the gas company loses vastly more by its slow meters than it gains by those which are fast.—W. S.

The Builders' Auxiliary, published by the Builders' Auxiliary Company, Corner Montcalm and Magog Streets, Sherbrooke, Que.

The Builders' Auxiliary is a series of books published with the purpose of making it easy for the architect and contractor or the engineer and contractor to estimate accurately and quickly the material required and the time it will take for construction and erection. The Estimate and Cost Sheets, which is their largest publication, is a loose-leaf system, and is accompanied by a number of smaller books such as the Material Book and the Time Book. The complete set costs \$5.00.

It is practically a carefully arranged, thumb-indexed list, loose-leaf system, and contains all the necessary and imaginable departments and sub-divisions for the careful estimator for all classes of construction together with a book for the keeping of the men on the work.

Not only will it save time in estimating, but it will make it almost impossible for the estimator to miss details which, without the schedule supplied by these publications, he would be in danger of overlooking. They will be found very useful for those having to do with construction work.

Highways of New York State, size 6 x 9, pp. 525, issued by the State Board of Highways for New York State, Albany, N. Y.

This report is a Government report published by a State Commission of Highways for New York, consisting of S. Percy Hooker, T. Warren Allen and Robt. Earle, and is for the year ending December 31st, 1909.

The report is very extensive and goes fully into the matter of highway construction for the State, some hundred pages being taken up with descriptions of the work done and the method of procedure. The remainder of the book is made up of tables and statistics showing cost of construction and repairs by counties.

The several inserts are particularly interesting, the first one showing by diagram, the general method of organization under the Commission. The second shows the average high and low bids on 212 roads in the State. The third shows the average cost of road construction by counties, while the fourth shows the amount spent for each year since 1889 on State highways in New York State.

In the reports of some of the deputies, interesting cost data has been furnished, showing the cost of grading, adding metal, oiling and surveying; and while it shows the cost proportion to the different departments of work, and the total cost of the work in this way gives considerable valuable information, yet amounts rather than time are given, thus losing considerable of the value.

Altogether the report is one of the most valuable on highway construction that has reached us this year.

Field Practice on Railway Location, by Willard Behan, size 6 x 3, pp. 250, price \$3.00. Published by the Engineering News Publishing Company, New York, N. Y.

The author of this book is division engineer of the Chicago and North Western Railway, and was formerly chief of locating party of Gould's South Western system of railways.

The object of the book is to present briefly and concisely, the methods commonly used by American engineers in locating steam railways.

Although we have a number of good books on railway maintenance, railway structures and track, for the locating engineer, the number of books is very limited, possibly because although the locating engineer may be a great reader, his opportunities for writing are not so good.

Select List of Engineering Books

IRRIGATION.

Practical Irrigation, Its Value and Cost.—By August J. Bowie, Jr. 252 pages, 6 x 9, 53 illustrations, \$3.00. Contains 100 tables of comparative cost, dimensions, capacities, design of reservoirs, wells, etc.

Irrigation Engineering.—By Herbert M. Wilson, Chief Engineer, N.S., Geological Survey. 6th edition, 625 pages, \$4.00.

Reservoirs, for Irrigation, etc., by James Dix Schuyler, 573 pages, \$6.00.

Practical Design of Irrigation Works.—By W. G. Bligh, \$6.00.

Irrigation Principles and Practice.—By Hanbury Brown, \$5.00.

POCKET BOOKS.

Molesworth's Pocketbook of Useful Formulæ, Memoranda, Tables, etc., for Civil and Mechanical Engineers. Twenty-fourth edition, thoroughly revised to date, rewritten and greatly enlarged, with an Electrical Section. 843 pages, limp leather, \$2.00.

Mathematical Handbook.—By Edwin P. Seaver, formerly Assistant Professor of Mathematics, Harvard University. 290 pages, 5 x 8½, 1,920 formulæ, 75 pages of tables, \$2.50.

Trautwine's Civil Engineers' Pocketbook.—Nineteenth edition, hundredth thousand, 1,257 pages, morocco binding, \$5.00.

Cost Data.—By H. P. Gillette. Second edition, 1,900 pages, leather binding. As a reference book on methods of construction of all classes of engineering works it merits a place in every engineer's or contractor's library. As a reference book on detailed costs it is obviously invaluable. \$5.00.

Building Foreman's Pocketbook and Ready Reference.—By H. G. Kichey, 1,118 pages, Morocco, \$5.00.

Architects' and Builders' Pocketbook.—By F. E. Kidder. 15th edition, revised. 1,703 pages, 1,000 figures, Morocco, \$5.00. Total issue, forty thousand.

Kent's Mechanical Engineers' Pocketbook. 16 mo, Morocco, \$5.00.

LIGHT AND POWER.

Hydro-Electric Practice.—By Henry A. E. C. Von Schon. A practical manual of the development of water-power, its conversion into electric energy and its distant transmission. 236 illustrations, 8vo., cloth, 348 pages, \$6.00.

Development and Electrical Distribution of Water-power.—By Lamar Lyndon. A purely engineering treatise. 158 illustrations, 8vo., cloth, 324 pages. New York, 1908. \$3.00.

Distribution of Electrical Energy.—By J. F. C. Snell. 169 illustrations, 8vo., cloth, 368 pages; net, \$7.50.

Long-Distance Electric Power Transmission.—By Rollin W. Hutchinson. A treatise on the hydro-electric generation of energy; its transformation, transmission and distribution. Second edition, 136 illustrations, 12mo., cloth, 345 pages, \$3.00.

Electric Power Plant Engineering.—By J. Weingreen. 420 pages, 6 x 9, illustrated, \$5.00.

Steam Power Plant Piping Systems.—By W. L. Morris, M.E. 490 pages, 6 x 9, 389 illustrations, \$5.00.

Water Power Engineering.—The Theory, Investigation and Development of Water Power. By Daniel W. Mead, Professor of Hydraulics, University of Wisconsin. 803 pages, 6 x 9, 413 illustrations, \$6.00. The standard work for both practice and instruction. It covers fully the details of the entire engineering problem from the first investigations to the completed plant.

Design and Construction of Hydro-electric Plants.—With special reference to the Design of Dams. By R. C. Beardsley. 520 pages, 6 x 9, 68 tables, 471 illustrations, \$5.00. A hydraulic and hydro-electric engineer's handbook.

Book Dept., Canadian Engineer, Toronto, Ont.

The book is primarily for chiefs of parties, for engineers sent out on their first location trip, and for students. Some attention is given to economic traffic, transportation, typography, geology and locomotive traction.

In addition to the text, the diagrams and illustrations are taken from actual practice, and when taken with the text, explain fully what is required for the different location surveys. Chapter I. takes up the character of the road, traffic and cost of construction. II. is devoted to recognition work and III. takes up the organization and equipment of parties and in connection with chapter III. an appendix is given which goes into detail on camp equipment and camp supply. Chapters IV., V., VI. and VII., while they have a definite bearing on the subject or deal with the subjects they are fully treated with in other works on railroad location.

Chapter VIII. is devoted to cost of capitalization. Chapter IX. to the located line, and the concluding chapter, chapter X., refers to records and costs of surveys.

PUBLICATIONS RECEIVED.

Massachusetts Highway Commission, Seventeenth Annual Report, 1909, issued by the Commission, Boston, Mass. Size 6 x 9, pp. 320, Pub. Doc.

Metropolitan Sewerage Commission of New York, 1910 Report, issued by the Commission. Size 8 x 11, pp. 545.

Annual Report of the Minister of Mines of British Columbia for the year ending 31st December, 1909, being an account of mining operations for gold, coal, etc., in the province. William Fleet Robertson, Provincial Mineralogist. (British Columbia, Bureau of Mines.) 298 p., plates, maps, 1909. Victoria, Government Printing Office, 1910.

Designing and Detailing of Simple Steel Structures, by Clyde T. Morris, C.E. Published by the Engineering News Publishing Co., 220 Broadway, New York, N.Y. Size 6 x 9, pp. 200, Price \$2.25.

The New Building Estimator, by Wm. Arthur, published by the David Williams Co., 14 Park Place, New York, N.Y. Size 4 x 6, pp. 500. Price \$2.00.

Estimating Data, by the Builders' Auxiliary Co., 4 Magog St., Sherbrooke, Que., size 3 x 5, pp. 70. Price \$1.00.

The Canadian Annual Review, 1909, by J. Castell Hopkins, F.S.S. Published by the Annual Review Publishing Co., 2 College St., Toronto.

Logarithmic Land-Measurement, by J. Wallace. Published by Spon & Chamberlain, 123 Liberty St., New York, N.Y. Size 6 x 9, pp. 32. Price \$1.25.

CATALOGUES RECEIVED.

Water Meters—The Buffalo Water Meter Co., 290 Terrace, Buffalo, N.Y., in a recent catalogue describe their American and Niagara water meters. The catalogue is fully illustrated Development Company, Limited.

Steam Pumps—Mussens, Limited, Montreal and Toronto, are distributing a catalogue describing the uses and merits of the pulsometer, a steam pump without rods, pistons or glands, or leather valves. It is a pump particularly adapted for foundation work or where the conditions are not suited for permanent pump and the water is loaded with silt.

Contractors' Locomotives—Andrew Barclay & Sons, Kilmarnock, Scotland, in a recent catalogue, describe their small locomotives of various gauges, suitable for contractors' work. A table devoted to the hauling power gives cylinder stroke and wheel dimensions, together with tractive efforts.

Concrete Machinery—The London Concrete Machinery Co., 19 Marmora St., London, Ont., describe their automatic continuous-batch concrete mixers. Hand and power sizes are described in both the portable and stationary classes.

TOTAL ISSUE, - 40,000

Kidder's Architects, and Builders' Pocket Book

16mo. Morocco, \$5.

Trautwine's Civil Engineers' Pocket Book

Total Issue, - 100,000 revised. 16mo. Morocco \$5

Second Edition, Revised.

KERR—Power and Power Transmission. 8vo, xiv + 366 pages, 264 figures. Cloth, \$2.00.

Third Edition, Revised and Enlarged.

KNEASS — Practice and Theory of the Injector. 8vo, iv + 175 pages, 53 figures. Cloth, \$1.50.

LEVIN — The Modern Gas Engine and the Gas Producer. 8vo, xviii + 485 pages, 181 figures. Cloth, \$4. net.

Fifth Edition, Rewritten.

PEABODY — Thermodynamics of the Steam-engine and other Heat-engines. 533 pages, 117 figures. Cloth \$5.00.

Second Edition, Thoroughly Revised.
PEABODY — Valve-gear for Steam-engines. 8vo, v+142 pages, 34 folding plates. Cloth, \$2.50

Second Edition, Revised and Enlarged.
PEABODY-MILLER — Steam-boilers. 8vo, viii + 434 pages, 176 figures, 5 folding plates. Cloth, \$4.00.

Eighth Edition.

Recomputed from New and Precise Experimental Data.

PEABODY — Tables of the Properties of Steam and other vapors, and Temperature-entropy Tables. 8vo, v+133 pages. Cloth, \$1.00.

Renouf Publishing Co.
25 McGill College Ave.
MONTREAL

ENGINEERING SOCIETIES.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—413 Dorchester Street West, Montreal. President, Col. H. N. Rutnan; 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, J. E. Schwitzer; 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

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CANADIAN GAS EXHIBITORS' ASSOCIATION.—Secretary-Treasurer, A. W. Smith, 52 Adelaide Street East, Toronto.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.—President, W. Doan, M.D., Harrietsville, Ont.; Secretary-Treasurer, Francis Dagger, 21 Richmond Street West, Toronto.

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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.

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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.

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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.

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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, L. C. Fritch, Chief Engineer, Chicago G. W. Railway; 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. J. W. Alvord, President; J. H. Warder, Secretary.

COMING MEETINGS.

NEW YORK CEMENT SHOW.—December 14-20, 1910. First annual convention in Madison Square Garden, New York. Under the management of the Cement Products Exhibition Company, 115 Adams St., Chicago.

CHICAGO CEMENT SHOW.—February 15-23, 1911. Fourth annual exhibition, at the Coliseum, Chicago, Ill. Under the management of the Cement Products Exhibition Company, 115 Adams St., Chicago.

THE ROYAL ARCHITECTURAL INSTITUTE OF CANADA.—August 24-27. Annual meeting at Winnipeg, Man. Alcide Chausse, Hon. Secretary, 5 Beaver Hall Square, Montreal, Que.

NEW ENGLAND WATER WORKS ASSOCIATION.—September 21-23. Annual meeting, Rochester, N.Y. Willard Kent, Secretary, Narragansett Pier, R.I.

AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.—October 11-16. Seventeenth annual convention, Erie, Pa. Prescott Folwell, Secretary, 239 W. 39th Street, New York, N.Y.

NATIONAL MUNICIPAL LEAGUE.—November 14-18. Annual meeting, Buffalo, N.Y. Clinton Rogers Woodruff, Secretary, North American Building, Philadelphia, Pa.

UNION OF CANADIAN MUNICIPALITIES.—August 31st to September 2nd. Tenth annual convention, Toronto, Ont. Secretary, W. D. Lighthall, K.C., Westmount, Que.; Assistant Secretary, G. S. Wilson, 107 St. James Street, Montreal, Que.

INTERNATIONAL MUNICIPAL CONGRESS AND EXPOSITION.—September 18-30, 1911, at Chicago, Ill. Curt M. Treat, Secretary, 1107-8 Great Northern Building, Chicago.

NATIONAL IRRIGATION CONGRESS.—Eighteenth Annual, September 26-30, 1910, Pueblo, Colorado. Secretary, Arthur Hooker, Spokane, Wash.

TORONTO, CANADA, AUG. 25, 1910.

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RAILWAY EARNINGS; STOCK QUOTATIONS.

Figures showing the earnings of Canadian roads since July 1st, this year and last, are appended:

C. P. R.	10,326	Aug. 14	\$12,724,000	\$10,217,000
G. T. R.	3,536	Aug. 14	4,774,767	5,182,446
C. N. R.	3,180	Aug. 21	1,963,400	1,397,000
T. & N. O. ...	264.74	Aug. 14	151,998	173,080
Hal. Elec.	13.3	Aug. 14	52,664	30,181

The following table gives the latest traffic returns it is possible to obtain at the time of going to press:

Road	Wk ended	1910	Previous week	1909
C. P. R.	Aug. 14	\$1,999,000	\$2,065,000	\$1,586,000
G. T. R.	Aug. 14	868,402	726,508	858,652
C. N. R.	Aug. 21	256,500	233,600	175,100
T. & N. O. ...	Aug. 14	29,418	22,573	30,120
Hal. Elec. ...	Aug. 14	5,419	5,071	5,010

Stock quotations on Toronto, Montreal and London exchanges, and other information relative to the companies listed in the above tables, are appended. The par value of all shares is \$100.

Co.	Capital. ooo's	Price Aug. 19	Price Aug. 11	Price Aug. 18	Sales last week.
C. P. R. ...	\$150,000	184 3/4	190 1/2	.....	1,345
Mtrl. St. .	18,000	.....	237-236 3/4	241 1/2-241	1,517
Hal. Elec.	1,400	117	121-119	125-124 3/4	342
Tor. St. .	8,000	125 1/4-125	.....	.....	890
G. T. R. .	226,000	1st pfd., 109 1/2; 3rd pfd., 57; com. 26 1/2	.....	.....	.....

MONTREAL STREET RAILWAY.

A small decrease in the surplus of the Montreal Street Railway in July in the face of a big gain in gross earnings is explained by three extra expenditures during the month.

The first was the increase in the employees' wages, which went into effect on July 1st, the second the larger amount of interest paid the city, while the third arises from the immense amount of construction work the company is doing all over the city.

The gross for the month showed a gain of \$53,273, or 15 1/2 per cent., and the surplus a decrease of \$905.

For the ten months, however, the surplus is 15 3/4 per cent. ahead of a year ago, the ten months' figures being:

	1910.	1909.	Inc.
Pas. earn.	\$3,402,275	\$3,064,270	\$338,005
Mis. earn.	88,370	73,276	15,094
Total earn.	\$3,490,646	\$3,137,546	\$353,099
Oper. exp.	\$2,021,516	\$1,866,015	\$155,500
Net earn.	\$1,469,130	\$1,271,531	\$197,599
City per cent.	255,100	204,187	50,913
Interest	146,387	150,703	.....
Leased lines	5,366	4,824	542
Taxes	40,000	28,800	11,200
Total chgs.	\$ 446,853	\$ 388,574	\$ 58,279
Surplus	1,022,276	882,956	139,319

G. N. R. STATEMENT.

The following shows the earnings and operating expenses of the C. N. R. during July, 1910:

	1910.	1909.	Inc.
Gross earnings	\$1,225,100	\$843,500	\$381,600
Expenses	876,900	613,900	263,000
Net earnings	348,200	229,600	118,600
Mil. in operation	3,297	3,094	203

G. T. R. STATEMENT.

The Grand Trunk's half-yearly statement for the period ending June 30 is moderately encouraging. A comparison shows:—

	1910.	1909.	Inc.
	£	£	£
Gross receipts	3,321,600	2,866,400	455,200
Working expenses	2,456,000	2,079,200	376,800
Net receipts	865,600	787,200	78,400
Rentals, etc.	58,100	58,100	.....
Total net	923,700	845,300	78,400
Charges, less credits	507,000	498,600	8,400
Can. Atl. def.	34,900	41,100	*6,200
Detroit def.	34,600	25,700	8,900
Balance after charges	347,200	279,900	67,300
Balance in	11,800	12,200	*400
Divisible	359,000	292,100	66,900
Guar. divid.	197,800	196,800	1,000
For prefs.	161,200	95,300	65,900
First pref. div.	85,400	85,400	.....
Secd. pref. div.	63,200	.....	63,200
Bal. forward	12,600	9,900	2,700

*Decrease.

On the whole, the half-year's results may be counted fairly satisfactory, and though, as has been said, some operators looked for a much larger balance than that actually shown after providing for the second preference dividend, the general market view was reflected in a substantial advance in the company's securities.

MOOSE JAW STREET RAILWAY.

Company Issues Detailed Prospectus and Estimates of Cost.

The prospectus of the Moose Jaw Electric Street Railway is ready for public issue. It is understood to be the intention of the directors shortly to issue a small block of stock to the general public of Moose Jaw. Directors and officers of the company are given by the prospectus as follows: President, A. A. Dion, general superintendent Ottawa Electric Co.; vice-president, N. J. Ker, engineer; secretary-treasurer, Doug. R. Street, secretary-treasurer Ottawa Electric and Gas Co.; directors, A. A. Dion, N. J. Ker, Daniel O'Connor, Edward J. Daly, Peter B. Mellon, D. R. Street, all of Ottawa, and E. M. Saunders, and Jas. T. Cashman, of Moose Jaw. E. J. Daly, of Ottawa, is the company's solicitor, and J. B. McRae, the engineer.

The authorized capital stock of the company is \$400,000, consolidated into 4,000 shares of \$100.00 each.

As to cost of construction the prospectus states there are no engineering difficulties involved. The cost of the six miles, which may be single or double track, but will be at first single track except on paved streets, where it may be advantageous to build double track, including land, buildings, roadway, overhead work, cars and engineering, is estimated at \$200,000.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

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

- 11299—July 26—Authorizing the C.P.R. to construct, maintain and operate an industrial spur across DeGaspe Avenue to the premises of the Wilson Paterson Co., Montreal.
- 11300—July 25—Authorizing the C.N.O. Railway to construct its lines and tracks across the public road between Lots 12 and 13, Concession "A," Township of Hamilton.
- 11301—July 27—Approving the location of the line of the C.N.R. from mileage 24 to 37.22 down the Fraser River from Yale, B.C.
- 11302—July 27—Approving the location of the line of the C.N.R. from mileage 15 to 24.7 up the Fraser River from Yale, B.C.
- 11303—July 27—Authorizing the Western Canada Power Company to construct its railway across Whonock Road, near Kuskin, B.C.
- 11304—July 27—Approving of the location of the Sudbury-Port Arthur Division of the C.N.O.R. through unsurveyed territory in the Sudbury Mining Division, mileage 180 to 200 from Sudbury Junction.
- 11305—July 25—Relieving the C.P.R. from providing, for the present, further protection at the crossing of Martin Street, Milton, Ont.
- 11306—July 25—Approving agreement between the Bell Telephone Co., and the George Wright & Co., re interchange of telephone messages.

(Continued on Page 250).

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.

Further information may be had from the issues of The Canadian Engineer referred to.

Place of Work.	Tenders Close.	Issue of.	Page.
Albany, N.Y., canals improvement	Sept. 7.	Aug. 18.	212
Augusta, Me., bridge	Sept. 9.	Aug. 18.	212
Charlottetown, P.E.I., electric light	Sept. 10.	Aug. 18.	211
Dauphin, Man., bridge	Aug. 27.	Aug. 18.	56
Dauphin, Man., waterworks and sewerage	Sept. 1.	Aug. 11.	180
Grand Forks, N.D., sand filter	Sept. 5.	Aug. 18.	212
London, Ont., bridge span	Aug. 27.	Aug. 18.	211
Marievile, Que., public building	Aug. 31.	Aug. 18.	211
Medicine Hat, Alta., gas engine	Sept. 1.	Aug. 11.	54
Montmagny, Que., wharf	Aug. 29.	Aug. 4.	146
Montreal, Que., dredging, concrete pier	Sept. 14.	Aug. 18.	54
Montreal, Que., office buildings	Aug. 30.	Aug. 18.	211
Niagara Falls, Ont., armory	Aug. 29.	Aug. 11.	180
North Vancouver, B.C., school	Aug. 30.	Aug. 18.	211
Ottawa, Ont., iron posts	Sept. 1.	July 28.	56
Ottawa, Ont., dipper dredge	Sept. 12.	Aug. 18.	53
Peterboro', Ont., sewage and electrical works	Sept. 1.	Aug. 18.	211
Port Arthur, Ont., breakwater	Aug. 31.	Aug. 18.	53
Port Credit, Ont., transformer station	Aug. 29.	Aug. 18.	54
Quebec, Que., bridge	Sept. 1.	June 30.	56
Saskatoon, Sask., sewers	Sept. 8.	Aug. 18.	56
Sedley, Sask., hall and fire station	Sept. 1.	July 28.	114
Shelburne, N.S., wharf	Sept. 6.	Aug. 18.	211
Spanish Ship Bay, N.S., wharf	Sept. 6.	Aug. 18.	211
Toronto, Ont., steel viaduct	Sept. 6.	July 28.	53
Toronto, Ont., track construction	Sept. 6.	Aug. 11.	53
Toronto, Ont., sewers	Aug. 29.	Aug. 18.	54
Victoria, B.C., school	Aug. 31.	Aug. 18.	212
Winnipeg, Man., underground cable	Sept. 1.	July 21.	54
Wiarion, Ont., breakwater	Sept. 12.	Aug. 18.	211

TENDERS.

Arthabaska, Que.—Tenders will be received until Sept. 7th for the construction of a public building. R. C. Desrochers, Secretary, Dept. of Public Works, Ottawa.

Quebec, Que.—The National Transcontinental Commissioners will shortly call for tenders for the construction of car ferries to carry traffic across the St. Lawrence River until the Quebec bridge is built.

Point Rielle, Que.—Tenders will be received until Sept. 19th for the construction of an ice pier. R. C. Desrochers, Secretary, Dept. of Public Works, Ottawa.

Roberval, Que.—Tenders will be received until Sept. 12th for the construction of a public building. R. C. Desrochers, Secretary, Dept. of Public Works, Ottawa.

Almonte, Ont.—The Mississippi River Improvement Co. are having prepared plans and specifications for the erection of two concrete dams at the foot of Long and Gull Lakes respectively. Tenders will be advertised for as soon as plans are approved by the Hydro-Electric Commission, and it is expected the work will be completed before winter.

Belleville, Ont.—Tenders will be received until Aug. 29th for improvements to the Tabernacle Church. G. S. Sharpe, Front St.

Bridgeburg, Ont.—Tenders will be received until Aug. 31st for the construction of a quarantine building. A. L. Jarvis, Asst. Deputy Minister and Secretary, Dept. of Agriculture, Ottawa.

Elad, Ont.—Tenders will be received until Aug. 31st for taking down old shed and rebuilding of new enclosed church shed. A. L. Pascoe, Secretary, Solina.

Kingston, Ont.—Tenders will be received until Aug. 27th for shingling the roof of fire station. W. W. Sands, City Clerk.

Peterboro', Ont.—Tenders will be received until Sept. 3rd for the erection of new buildings for Murray St. Baptist Church. Burke, Horwood & White, Architects, 28 Toronto St., Toronto.

Peterboro', Ont.—Tenders will be received until Sept. 6th for the various trades in connection with the extension of machine shop. Canadian General Electric Co., Ltd., 212 King St. W., Toronto.

Rainy River, Ont.—Tenders will be received until Sept. 6th for the following:

- A.—Laying 300 feet of 15-inch sewer pipe.
- Laying 650 feet of 12-inch sewer pipe.
- Laying 650 feet of 10-inch sewer pipe.
- Laying 1,700 feet of 9-inch sewer pipe.
- Laying 350 feet flexible joint iron pipe.
- Constructing 19 manholes.
- Constructing 2 flush tanks.
- Constructing 6 lamp holes.
- Constructing pump house and installing machinery.

- B.—Laying 3,450 feet of 6-inch pipe.
- Laying 1,100 feet of 8-inch pipe.
- Laying 3,300 feet of 9-inch pipe.

- C.—Installing disposal plant.
- J. H. Wilson, Town Clerk.

St. Catharines, Ont.—Tenders will be received until Aug. 31st for the erection of an office building for the Security Loan and Savings Co. A. E. Nicholson, Architect, 46 Queen St.

Toronto, Ont.—Tenders will be received until Aug. 30th for the construction of 66 feet wooden sheet piling. G. R. Geary (Mayor), Chairman, Board of Control.

Toronto, Ont.—Tenders will be received until Aug. 30th for all trades in connection with the construction of a fire alarm telegraph building. G. R. Geary (Mayor), Chairman, Board of Control.

Toronto, Ont.—Tenders will be received until Aug. 27th for brick work, cut stone, structural steel and all carpenter work required in the erection of an office, warehouse and elevator building for Faramel, Ltd. F. H. Herbert, Architect, 65 Adelaide St. E.

Toronto, Ont.—Tenders will be received until Aug. 26th for the enlargement of Humberdale Collegiate Institute—all trades. Fittings for Science Rooms, Harbord Street Collegiate and Riverdale High School, cabinet work, plumbing and electric wiring. Fittings for Domestic Science Rooms, Brown, Kent and Kimberley Schools, cabinet work and plumbing. Furnaces for caretakers' cottages Lansdowne and Jesse Ketchum Schools. W. H. Smith, Chairman of Committee, Board of Education, City Hall.

Souris, Man.—Tenders will be received until Sept. 1st for supply of 80 cords wood. S. S. Smith, Sec.-Treas., School Board.

Winnipeg, Man.—Tenders will be received until Sept. 14th for the wiring system required in connection with the locomotive shops of the Transcontinental Railway. P. E. Ryan, Secretary, the Commissioners of the Transcontinental Railway.

Winnipeg, Man.—Tenders will be received until Sept. 14th for air, steam, water and oil piping system, also pipe tunnel and wiring ducts, required in connection with the Transcontinental Railway shops east of Winnipeg. P. E. Ryan, Secretary, The Commissioners, The Transcontinental Railway.

Dubuc, Sask.—Tenders will be received until Aug. 31st for the erection of a school building. J. L. Bartley, Sec.-treasurer.

Rosetown, Sask.—Tenders will be received until Aug. 31st for furnishing the lumber and building a schoolhouse. Geo. Hare, Sec.-Treas., Camberley School.

Regina, Sask.—Tenders will be received until Sept. 8th for approximately 140,000 square feet of concrete sidewalk. L. A. Thornton, City Engineer. (Adv. in The Canadian Engineer.)

Regina, Sask.—Tenders will be received until Sept. 8th for approximately 19,000 lineal feet curb and gutter and 3,000 lineal feet of curb. L. A. Thornton, City Engineer. (Adv. in The Canadian Engineer.)

Weyburn, Sask.—Tenders will be received until Aug. 31st for a sewage ejector station and sewage disposal works. Chipman & Power, Engineers, Winnipeg and Toronto.

Chilliwack, B.C.—Tenders will shortly be invited for the construction of a two-storey reinforced concrete town hall.

CONTRACTS AWARDED.

Buckingham, Que.—Wilson & Carriere, of Hull, have received a \$9,000 contract for the construction of a sewerage system.

Coaticook, Que.—Helmer & Winstanley got the contract for the reinforced concrete bridge over the Coaticook River.

Verdun, Que.—The town council have contracted with Messrs. Quinlan & Robertson for the construction of a river dyke.

Galt, Ont.—The contract for the cement bridges on Kerr and Ainslie Streets was let to Thomas & Hancock, for \$1,390.

Fort William, Ont.—Carter, Halls, Aldinger Company, general contractors of this city, have been awarded the contract for the construction of the new Canadian Pacific car shop. Ground has been broken, and test pits were dug for the foundation of the shops, which will be located in the yards near the overhead bridge. The structure is to be 170 by 50 feet.

London, Ont.—C. Leathorne was awarded the contract for the storm water drain, at \$749, side drains, 29 cents per foot. Other bidders were:

Thomas Martin	\$987.80	Side drains, 40c. per foot.
B. Johnson	850.00	" " 40c. "
W. J. Johnston & Co..	818.00	" " 41c. "

Geo. W. Wright, Deputy City Engineer.

London, Ont.—The Metal, Shingle and Siding Co., of Preston, were given the contract for roofing the main building of the Western Fair, at \$970. Hyatt Bros. received the contract for the erection of a transformer substation at \$3,550.

London, Ont.—Tenders for the concrete abutments and floor of the bridge on First street, London Township, were opened, as follows: Kelly & Winters, \$507, R. Waltham, \$455; W. S. Odell, bulk tender for this and the county bridge, \$1,123; Levi Crouse, \$480; F. E. L. Talbot, \$430; Joseph Paterson, \$483; W. J. Anthistle, bulk tender for this and the county bridge, \$1,340. The contract went to F. E. L. Talbot.

London, Ont.—The contract for the iron poles for the ornamental street lighting system on Richmond and Dundas streets has been awarded to the Vulcan Iron Company, of this city, for \$34 for each pole. There will be 76.

New Liskeard, Ont.—The contract for the ten thousand dollar library was let to Dalgleish Bros. This building is 52 feet by 42 feet and will cost \$10,000.

Smith's Falls, Ont.—M. McCormack, of Sudbury, and J. H. Morin, of Montreal, received the contract for the C. P. R. subway on Cornelia Street.

Toronto, Ont.—The contract for 986 feet of granolithic sidewalk on Markham St. was given to E. J. Elliott, Toronto, at 49 cents per lineal foot. Barber & Young, Engineers.

Toronto, Ont.—The Board of Control awarded the following contract in connection with the erection of a substation at the corner of Ruskin and Edward Avenue: Mason work, Teagle & Son, \$26,905; deduct \$1,800 if artificial stone is used instead of Ohio stone, \$25,105; roofing, Duthie & Co., \$187; plumbing, Fred Armstrong Company, \$410. The total amounted to \$25,872.

Toronto, Ont.—The following tenders for the addition to the high-level pumping station building were accepted: Masonry, Brown & Love, \$13,700; carpentry, George Henry,

\$2,299; plumbing, H. W. Johnston, \$397; roofing, Flowers & St. Leger, \$425.

Brandon, Man.—The C. N. R. awarded contract for a seven-storey hotel to Thos. Kelly & Son, Winnipeg.

Moose Jaw, Sask.—Patrick Kilkenny, of Moose Jaw, got the contract for supply and laying of 3,286 lineal feet of 6-inch, and 700 feet of 12-inch, cast-iron water mains, at \$13,975.50. Mr. Coleman, a local man, bid \$14,550.00.

Moose Jaw, Sask.—R. L. Frost, Moose Jaw, received the contract for laying of 63,000 square feet concrete walks and 9,000 lineal feet combined curb and gutter and 6,000 square feet of concrete crossings at \$15,330. Other bidders were: W. E. Ransom, Moose Jaw, \$16,072.50, and the Western Pavers, Limited, Winnipeg, \$16,417.50. The contract for six miles wooden sidewalk was awarded to Contractor Ross, Moose Jaw, at 29 cents per lineal foot. Other prices submitted were: Messrs. Walker, 29½ cents; McLeod, 33½ cents, and Fenwick, 33 cents per lineal foot. J. M. Wilson, City Engineer.

Regina, Sask.—The contract for the \$25,000 building for the National Drug and Chemical Company was awarded to Wilson & Wilson.

Swift Current, Sask.—Laidlaw & McDonald, Fort William, Ont., have been awarded the contract for the construction of four miles of sewers and six miles of waterworks in Swift Current.

Edmonton, Alta.—Gorman, Clancy & Grindley, of Edmonton, received the contract for 200,000 square feet wire fabric for concrete floors.

High River, Alta.—McKibbin Bros., Calgary, received the contract for the construction of 3,000 square yards of cement sidewalk at 9¾ cents square foot for walks, 10¼ cents square foot for crossings. Other bidders' prices were as follows: 10 cents square foot for all; 10 7-10 cents for walk, 12 7-10 cents for curb; 10 cents for walk, 12½ cents for crossings; 10 7-9 cents for walk, 22 cents lineal foot for curb.

High River, Alta.—The contract for 800 barrels of Portland cement was given to Kelly & Young, a local firm, at \$3.20 per barrel, f.o.b. High River.

High River, Alta.—Carmangay School contract was awarded to P. Taylor, local, at \$14,000.

New Westminster, B.C.—The Canadian British Insulated Company of Montreal, Lawford Grant, Managing Director, have received a contract for 40 miles of street railway equipment from the British Columbia Electric Railway.

Nanaimo, B.C.—The new fire hall contract was awarded to Mescher Bros., of Victoria, at \$29,310. McDonald & Perry, of Vancouver, got the contract for heating at \$2,690.

Prince Rupert, B.C.—Eight tenders were received for the first street grading and plank roadways that will be undertaken by Prince Rupert. The bids were referred to the streets committee. The tenders were as follows: Neil Norman, close cutting and grading \$5,453.71 made up by rock excavation \$3.50, and earth \$1.00; S. H. Watson & Company, building plank roadway, \$1,236, close cutting and grading \$4,103, rock \$2.40, earth 70 cents; E. C. La Trace, plank road \$782.45, close cutting \$120, rock \$2.40, earth 90 cents; John Swanson, grading \$2,311, rock \$2.25, earth \$1.00; S. B. McCordie & Co., roadway \$1,239.46, grading and close cutting \$4,213.20, rock \$2.50, earth \$1.20; W. H. Mitchell & Co., grading and close cutting \$3,912.60, rock \$2.50, earth 60 cents; City Engineer, roadway \$1,300, grading \$4,000, rock \$200, earth 60 cents. The above tenders are for building a sixteen foot plank roadway on Beach Place, Tenth and Eleventh streets and for grading the same.

Vancouver, B.C.—Tenders for constructing a wharf at the foot of Balsam Street for the landing of supplies for the Kitsalano district were as follows: Ironsides, Rannie & Campbell, \$9,796; Higman & Doctor, \$10,720; H. V. Tucker, \$11,985; Armstrong, Morrison & Co., \$7,835.

A contract for the extension of the Kettle Valley Railway line from Rock Creek to Bull Creek, on the west fork of Kettle River, a distance of thirty-five miles, has been awarded to Messrs. L. M. Rice & Co., contractors, of Vancouver and Seattle.

Victoria, B.C.—The Canada Foundry Co., of Toronto, were given the contract for cement mixer at \$1,910. L. A. Borde, of Victoria, was awarded the contract for installing a complete system of cluster lights. Contract price, \$3,481. Other bids were: Electrical Construction Co., Vancouver, B.C., \$3,575; Hutchison Bros. & Cohid, Victoria, \$3,750.

Victoria, B.C.—The tender of Parfitt Bros. for the building of a number of stalls in the market building and laying a concrete floor was accepted at \$1,794.



Parsons Excavator-Carlsbad, N.M.

Parsons Trench Excavator

One machine adapted to every Job.

It digs any width between 28 and 78 inches and any depth desired, without change of parts; and deposits excavated material on either or both sides of the trench.

It works in any soil except solid rock. The buckets clean themselves

Strength, with no excessive weight, made possible by the use of the best material in construction, insures a minimum cost for maintenance and operation.

No other machine can do as much work; can save as much time and money; or can adapt itself to as large a field. We have demonstrated this to be true on work in many parts of the United States and Canada.

WE SELL - DO NOT LEASE

George A. Lambert, Sales Manager
The G. A. Parsons Company, Newton, Iowa

THE GLOBE, TORONTO, MONDAY, MARCH 21, 1910.

The Canadian Engineer Offers to Municipal Officials

The free use of their offices at Toronto, Winnipeg and Montreal for the filing of plans, specifications and tender forms for all Municipal work. Proper accommodations for inspecting the blue-prints are given visiting contractors and manufacturers. More interested persons will call than will take a long trip to see the plans. It ensures your requirements being seen by a much larger number of contractors and manufacturers—and without any additional cost.

Draw up your advertisements on the plan of these two, mentioning any one or more of our offices. You have our permission. Merely send us the plans and specifications. We'll look after them carefully.

MONTREAL **The Canadian Engineer** **TORONTO**
WINNIPEG **London, Eng.**



Supply of Steel Pipe

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on April 5th, 1910, for the supply of one thousand feet of riveted steel pipe, seventy-two inches in diameter, and also twenty flexible joints.

Specifications may be seen and forms of tender obtained at the office of the City Engineer, Toronto, and at the office of the Canadian Engineer, at B-33, Board of Trade Building, Montreal.

The usual conditions relating to tendering, as prescribed by City By-Law, must be strictly complied with, or the tenders will not be entertained.

The lowest or any tender not necessarily accepted.

G. B. GEARY (Mayor),
Chairman Board of Control,
City Hall, Toronto, March 18, 1910.

RAILWAY TIME TABLE

Grey System

TENDERS.

CITY OF SASKATOON

TENDERS WANTED

Steel Overhead Footbridge at Twentieth Street.

Sealed tenders, addressed to the undersigned City Clerk and enclosed tender "A" and tender "B" will be received for the construction of a Steel Overhead Footbridge at 20th Street, until 5 o'clock p.m. on the following dates:

Contract "A" Foundations, Monday February 11th, 1910.

Contract "B" Steel Superstructure, Monday, February 21st, 1910.

Plans, specifications, etc. may be seen at the Office of the City Engineer, Saskatoon, also at the Office of the Canadian Engineer, at the following addresses:

Saskatoon, 62 Church Street, Phone Main 541.

Montreal, B-33 Board of Trade Building, Phone M. 1001.

Winnipeg, Room 313 Nanton Building, Phone 812.

The lowest or any tender not necessarily accepted.

WILLIAM HOPKINS
Mayor.

J. H. TRUSDALE
City Clerk.
Saskatoon, January 21st, 1910.

RAILWAYS—STEAM AND ELECTRIC.

Montreal, Que.—A building permit has been taken out for a \$37,000 C.P.R., depot at Mile End.

Fort William, Ont.—Messrs. O'Brien, Fowler and McDougall Bros., who have large construction contracts on the Transcontinental Railway, will move their head offices next week from Fort William to Lake Superior Junction.

Ottawa, Ont.—This fall the G.T.P. will be operating a two hundred and fifty-mile stretch of new transcontinental road between Weymontachene and the St. Lawrence River. The road will soon be turned over to the G.T.P. and a regular train service put on. It is expected that a large freight business will be done in lumber. Within the next two or three months the National Transcontinental Commissioners will invite tenders for the construction of car ferries to carry traffic across the St. Lawrence River until the Quebec bridge is built. There are car ferries now operating with a capacity of thirty freight cars. It is expected that the new ferries will at least be as large as these. The line will be completed through New Brunswick shortly, and with a ferry service across the St. Lawrence a through train service will be put on from Weymontachene to Moncton, probably next spring.

Windsor, Ont.—The Grand Trunk is preparing to improve its roadbed in Western Ontario, by laying ninety-pound rails in place of the eighty-pound rails in use now. A cargo of the new rails has been unloaded at the company's docks here.

Winnipeg, Man.—New street car lines have been proposed for Grey, Carter, and Chalmer streets.

Winnipeg, Man.—The Canadian Northern Railway is reported to have completed arrangements with the council of the city of St. Boniface for extensive improvements there within the next two years, including a large roundhouse, storehouses, coal warehouses, freight sheds, the union depot to be shared with the Grand Trunk Pacific and a new traffic bridge, to be built across the Red River from Winnipeg. The improvements will cost over a million dollars, and the company has signed a bond guaranteeing the completion of the work within the two years.

Victoria, B.C.—A contract for the extension of the Kettle Valley Railway line from Rock Creek to Bull Creek, on the west fork of Kettle River, a distance of thirty-five miles, has been awarded to Messrs. L. M. Rice & Co., contractors of Vancouver and Seattle. The grade has already been completed from Midway west for ten miles. Construction work will be started within three weeks. The building of a twenty-five mile section of the same road from Merritt south through Nicola Valley is now in progress. The company has authority to extend its line from a point south of Merritt, across the Hope mountains to Ruby Creek, below Hope. At Ruby Creek after bridging the Fraser River connection will be established with the Canadian Pacific Railway, whose tracks it already connects with at Midway and Merritt. The distance from Midway to Ruby Creek is about 271 miles. By means of its connections the Kettle Valley route will afford as direct a line between the coast and Kootenays as the V., V. & E. Railway.

LIGHT, HEAT AND POWER.

Calgary, Alta.—City Engineer Child has reported on the proposal to develop 3,500 horse power on the Elbow River. The estimated cost of the work is placed at \$800,000, while the cost per h.p. is figured at \$25.

Prince Rupert, B.C.—City Engineer, Wm. Mahlon Davis, formerly of Berlin, Ont., has prepared a report on the installation of an electric light plant for Prince Rupert. The total cost of the proposed plant is placed at \$8,083, which includes the following items: (a) generator, 60 K.W. with exciter switch board, \$2,000; new poles \$417; engineering and erection, \$1,000; (b) 64,118 feet of No. 4 x No. 6 wire, \$2,088; pole and cross arms, transformers, etc., \$1,478; engineering and erection, \$2,000. Mr. Davis also considered the installation of a steam plant at the foot of McBride street of sufficient capacity to provide 5,000 16 C.P. lamps for Section 1. The cost of this installation would be \$30,000 of which one half would be expended for the steam generating plant. A proposal for a gas producer plant to operate

a 75 K.W., A.C. generator has been submitted. The cost of this plant for the generation of electricity is submitted at \$11,840. To this would have to be added cost of pole lines and distribution, \$1,000, making a total of \$21,000. This proposition would provide 3,000 Tungsten lamps. The report was referred to the Light Committee.

BY-LAWS AND FINANCE.

Chippawa, Ont.—A by-law was passed authorizing the issue of \$30,000 debentures for waterworks system.

Guelph, Ont.—Sept. 26th is the date set for the voting of the People's Railway by-law, as to whether they are in favor of putting \$85,000 in the preferred stock of the railway.

North Bay, Ont.—The Township of Widdifield passed a by-law to raise the sum of \$33,000 for the purpose of opening, improving, grading and gravelling streets, also for construction of waterworks.

Sandwich, Ont.—Ratepayers favored granting inducements to the Canadian Salt Company, who will erect a \$250,000 chemical plant here.

Tillsonburg, Ont.—The Hydro-electric power by-law was passed by the ratepayers here.

Regina, Sask.—A by-law was passed to provide for the raising of \$132,000 for pavements, and \$28,000 for sidewalks.

Calgary, Alta.—Council has given the necessary readings to street railway extension by-law of \$484,000, and to the subway by-law of \$40,000.

Medicine Hat, Alta.—The following by-laws all carried by large majorities: Installation of electric plant, \$50,000; aid to hospital, \$10,000; industrial sites, \$18,500; waterworks extension, \$45,000; improvement of cemetery, \$4,000; total, \$127,500.

Fernie, B.C.—A by-law was passed to borrow \$27,000 for sewer extensions and \$4,500 for the purpose of installing a fire alarm system.

North Vancouver, B.C.—The ratepayers passed by-laws totalling \$120,000 for schools, and subscription for stock in the Second Narrows bridge project.

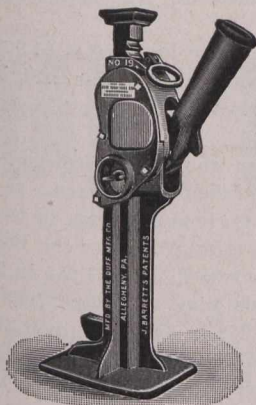
Prince Rupert, B.C.—Ratepayers voted in favor of municipal ownership of telephones. Some new equipment will be required.

Victoria, B.C.—The taxpayers, on Aug. 29th, will vote on the following by-laws: School loan, \$45,000; sewer construction, \$50,000; public convenience, \$20,000; Isolation hospital, addition and alterations, \$15,000; Dallas Road Foreshore, wall erection, \$75,000; underground telephone, \$100,000.

SEWAGE AND WATER

Ottawa, Ont.—A preliminary estimate places at two million dollars the cost of bringing water to the city from McGregor's and adjoining lakes. The final figures will not be known until test pits are sunk and detailed estimates are figured out, but the figures stated are approximately correct. It is expected that the report of Mr. Allen Hazen, the water expert, will be ready in a month. The distance of the Gatineau lakes from the city is about fifteen miles and their elevation above sea level nearly fifteen hundred feet. One of the big elements of cost would be in constructing the pipes under the Ottawa river from the Hull side. The detailed estimates of the cost of the new water supply will be ready by fall and there is just a possibility that a by-law may be submitted to the ratepayers at the next election. There has generally been a disposition however, to regard the new source of water supply as a matter of the more distant future.

Winnipeg, Man.—A special meeting of the aldermen and members of the board of control will consider the plans and estimates which the city engineer will present for sewer outlets in different parts of the city. These plans call for an expenditure of \$629,708, and involve the making of four new outlets; one into the Red River and three into the Assiniboine. The estimates show the cost of making four new trunk sewage districts as follows:—District north of Polson avenue—Jefferson avenue, McPhillips, Red River, \$275,600; McPhillips street, Jefferson, Selkirk avenue, \$118,500; total, \$394,100. Clifton district—Clifton, Portage, Sargent, \$101,000.



BARRETT JACKS

"For general track repairs we would recommend THE BARRETT JACK, as the best for this work that we know of." (Extract from Report of Committee appointed by Roadmasters' Association.

THE DUFF - BETHLEHEM FORGED STEEL

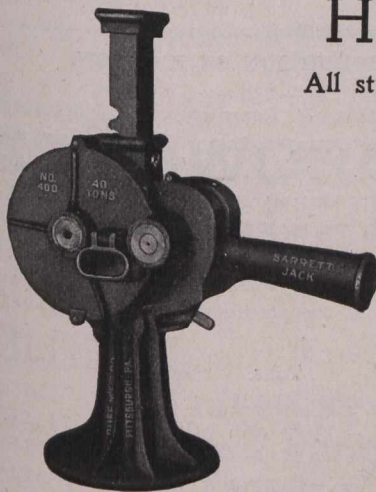
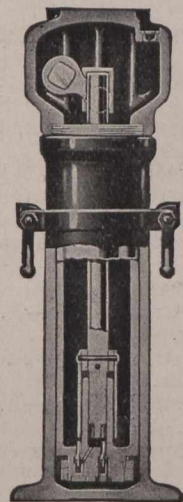
HYDRAULIC JACKS

All styles and Capacities for a Vertical or Horizontal Lift

These Jacks are made entirely of forged steel and weigh from 30-60% less than any Jack of the same capacity.

They contain but few moving parts and are self contained.

The cylinder and face are forged from the solid, as is also the ram. This reduces picking and lessens the liability of leaking. One man can easily lift the entire stated load of any Jack, whether it is the 10 ton or 250 ton size.



The Canadian Fairbanks Co., Ltd.

Fairbanks-Morse Gas Engines. Fairbanks Scales. Safes & Vaults
Montreal, Toronto, St. John, N.B., Winnipeg, Calgary, Vancouver

222; Lavinia, Clifton, Strathcona, \$6,757; Sargent, Clifton, Strathcona, \$6,757; total, \$114,736. District west of Clifton—Centre from Assiniboine River to Portage avenue, \$19,382. Ash street district—Ash street, Assiniboine River to Godfrey, \$44,495; Godfrey, Cambridge street to Renfrew, \$56,905; total, \$101,400. Grand total for four districts, \$629,708.

MISCELLANEOUS.

Brantford, Ont.—The Penman Co., will build an \$80,000 extension to their factory.
Cobourg, Ont.—The International Tool Steel Company, of Toronto, will establish a factory here.
Hamilton, Ont.—A \$100,000 extension will be made to the Hamilton Bridge Company's works.
London, Ont.—City council is dealing with the suggestion of the Underwriters' Association to purchase another steam fire engine.
Orillia, Ont.—Notwithstanding the insufficient vote on the by-law, the Canada Refining and Smelting Company will establish a \$15,000 plant here to smelt, when completed, twenty tons of ore a day.
Toronto, Ont.—An examination for admission as Associate of the Royal Institute of British Architects, London will be held in Toronto from the 17th to 23rd of November, 1910. Full particulars regarding this can be had from F. S. Baker, Traders Bank Building.
West Toronto, Ont.—The Canada Cycle & Motor Co., are erecting a \$100,000 addition to their plant here. Much new machinery will be required.
Welland, Ont.—Deere & Co., the farm implement manufacturers, have decided to establish large works at Welland.
Winnipeg, Man.—One day's list of building permits, totalling \$298,300, included the Christian Science church to be built on River Avenue at a cost of \$70,000 and the MacLaren Bros. hotel on Main Street to cost \$165,000.
Winnipeg, Man.—The Board of Control invites the Architects to submit competitive plans and specifications for

a Tubercular Hospital for the City of Winnipeg. The time for receiving plans will close on Monday, September 12th. M. Peterson, Secretary, Board of Control.

Winnipeg, Man.—City Engineer Ruttan estimated the cost of a new bridge and of a subway at Salter street as follows: Bridge 26 feet wide for two street car tracks and two lines of traffic, with 2-foot 6-inch sidewalks, \$283,350; 34 feet wide, \$368,909; 42 feet wide, \$451,359. Subway, same accommodation for traffic as the 26-foot bridge, \$525,000.

PERSONAL.

Mr. Thomas Donavon, has been appointed superintendent of outside work at Victoria, B.C., under City Engineer Angus Smith.

Mr. D. P. Roberts, who at present holds the position of electrical engineer at London, Ont., has been appointed electrical expert and inspector for the British Columbia Government.

Mr. G. Gordon Gale, General Superintendent of the Hull Electric Railway has invented an attachment for fare boxes which prevents dishonest employees from opening the fare boxes without detection, it being thought better to make it difficult for men to do wrong rather than to punish them when detected in crime.

Mr. Wilson S. Kinnear, assistant general manager and chief engineer of the Michigan Central Railway, who is widely known as the man who built the Detroit River Tunnel, which will be opened next month, has accepted the position of president of the Kansas City Terminal Railway Company at a salary of from \$30,000 to \$50,000 a year. Mr. Kinnear is a Kansas man. He was graduated from the University of Kansas in 1883, and from that year to 1887 was employed in surveying work for construction and maintenance with south-western roads—at first with the Santa Fe. From 1887 to 1888 he was engaged in hydraulic engineering in Southern California. In 1889 he was in Chili as assistant chief engineer of the North and South American Construction Com-

pany. In 1890 he came to the Michigan Central as assistant engineer of the Canadian division, and held that position until 1895, when he became supervising engineer for the T., H. and B. In 1898 he was appointed principal assistant chief engineer of the Michigan Central. In 1901 he left the engineering branch of the railway business to become assistant superintendent of the Canadian division of the Michigan Central Railway. He was next appointed assistant general superintendent of the Michigan Central in June, 1902, and in August, the same year, on the death of Chief Engineer Augustus Torrey, succeeded to the chief engineering position with the road. In April, 1905, he was appointed assistant general manager and at the same time chief engineer of the Michigan Central tunnel operations.

(Continued from Page 236).

NOVA SCOTIA CIVIL ENGINEERS

Hold Their Annual Meeting at Halifax and Elect New Officers.

The Nova Scotia Society of Engineers, who are meeting at Halifax this week, have elected the following officers for the coming year:—

President—J. W. McKenzie, Halifax.

First Vice-President—P. A. Freeman, Halifax.

Second Vice-President—W. G. Yorston, Sydney.

Secretary and Treasurer—J. Lorn Allan, Dartmouth.

District No. 1—Hiram Donkin, A. R. MacCleave, Halifax.

District No. 2—R. W. Mackenzie, D. McD. Campbell, Sydney.

District No. 3—A. G. Robb, Amherst; J. G. Mackenzie, Westville.

District No. 4—L. C. Gelling, Bridgewater; Percy E. Brown, Westville.

Auditors—Harry A. Russell, J. S. Meisner, Dartmouth.

Friday's programme was as follows:—

Morning, 9.30 to 12.30—Reading and discussion of the following papers:—"Water Powers of Nova Scotia," by W. G. Yorston, C.E.; "Recent Developments in Technical Education," by F. H. Sexton, director of technical education, Nova Scotia.

Afternoon Session, 2 o'clock—Meet at the telephone building and afterwards proceed by train line to visit the following industries:—Silliker Car Company, Halifax dry dock, Halifax Tram Company's power house, Nova Scotia Technical College.

Evening Session, 7.15—Dinner at Birchdale Hotel, N. W. Arm; **8.30**—Waegwoltic Club band concert, N. W. Arm.

ONTARIO POWER CO.

The Ontario Power Company, which is under contract to supply power to the Hydro-Electric Commission, and which owns all of the \$1,000,000 capital stock of the Ontario Transmission Company, and guarantees its bonds, has leased the properties, franchises and future undertakings of the transmission company to April 1, 1950, with the privilege to acquire the property after the bonds have been retired, or which may be issued shall have been paid and retired by the power company.

In consideration of this lease the power company agrees to pay to the transmission company by way of rent a sum calculated at the rate of \$2.50 per annum for each electrical horse power of the power company transmitted over the transmission company's lines.

The Ontario Power Company has \$5,621,000 capital stock outstanding, \$5,768,000 first mortgage 5s, and \$3,000,000 debenture 5s. For the year ended on June 30, 1910, the combined earnings of the two companies showed gross receipts from sale of power of \$704,000, an increase over 1909 of \$250,000, or 55 per cent.; net after expenses was \$522,000, an increase of \$349,000, or over 200 per cent. Surplus after charges was \$118,873, against a deficit of \$128,020 last year. In the figures

for 1909, appears a deduction of \$134,657 on account of flood damages. Excluding these deductions, the improvement in surplus amounted to \$112,236.

The company's sale of power now aggregates 61,500 horse power per month. Installations now in progress will increase this output to 82,000 horse power per month before the close of the year.

The monthly sales of power show improvement, in the United States, where the transmission lines extend as far as Erie, Pa., and Syracuse. The improvement shown in the Canadian provinces has, however, been marked. Over the Canadian-Niagara line sale of power has increased from \$1,653 in September last to \$10,347 in July of this year, over the Welland line from \$9,437 in September to \$10,968 in July, and over the Port Colborne line from \$1,893 to \$2,059. The total for all sales has increased from \$54,794 in September last to \$62,524 in July of this year.

WORLD'S PRODUCTION OF PIG-IRON.

Messrs. James Watson & Company, of Middlesbrough, Glasgow, Liverpool, and Swansea, have issued their annual statistics of the world's production of pig-iron. The figures relating to the leading producing countries have already appeared in our columns, but we reproduce them in the convenient tabular form in which they appear in the return, along with the outputs of the smaller producers. The totals in each case are compared with those of the previous year and of 1907:

	1907.	1908.	1909.
	Tons.	Tons.	Tons.
United States	25,781,301	15,936,018	25,795,470
Germany.	13,045,760	11,813,511	12,917,653
Great Britain	9,923,856	9,289,840	9,664,287
France.	3,588,949	3,344,145	3,544,638
Russia.	2,748,298	2,751,000	2,817,000
Austria and Hungary	1,789,165	1,952,750	1,947,300
Belgium.	1,427,940	1,182,311	1,632,350
Sweden.	603,400	563,300	443,000
Spain.	380,580	430,000	420,000
Canada.	581,146	563,672	677,000
Italy.	148,200	80,000	147,000
Japan.	42,919	147,217	150,000
India.	40,000	38,000	39,350
China.	62,148	66,409	74,000
Mexico.	16,238	16,615	58,850
	60,179,960	48,174,788	60,327,998

NEW INCORPORATIONS.

Montreal.—Lands, Limited, \$100,000; J. A. Guimond, B. Lefebvre, D. Semple. Mechanical Equipment Company of Canada, \$50,000; S. Davis, J. Presner, J. Franklin. Spanish Art Leather Co., \$20,000; J. Beaulac, O. Brunet, E. A. Marchildon. South Shore Lumber Co., \$20,000; H. E. Walker, Westmount; H. N. Chauvin, G. H. Baker. Montreal. Willis, Faber & Co., of Canada, \$100,000; R. Willis, H. J. Hague, S. L. D. Harris.

Regina, Sask.—The Lumsden Gravel Co., Limited, \$9,000.

Saskatoon, Sask.—Cousins Purchasers.

Cailmount, Sask.—Weleyn Rural Telephone Co.

Audrey, Sask.—Audrey Rural Telephone Co.

Moose Jaw, Sask.—Carmel Rural Telephone Co.

Edmonton, Alta.—Lilge Rotary Engine, Limited.

Flying Shot Lakes, Alta.—The Clifford Improvement & particular advantages of the meters explained.

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ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

(Continued from Page 242).

- 11307—July 26—Authorizing the Grand Trunk Pacific Branch Lines Company to cross the C.N.R. in N. E. $\frac{1}{4}$ Section 20-38-26, W. 2 M., at Dana, Sask.
- 11308—July 28—Authorizing the C.N.O.R. to carry freight over the portion of its line from the junction with its main line at Udney, to Atherley, Ont., at a speed not exceeding ten miles an hour.
- 11309—11310—11311—July 27—Authorizing the Provincial Natural Gas & Fuel Co., to lay and maintain an eight-inch gas pipe under the G.T.R., at Dain Avenue, and Hellams Avenue (twice), in the town of Welland, Ontario.
- 11312—July 28—Authorizing the City of Chatham to lay and maintain water mains under the P.M.R.R. on the London Road.
- 11313—July 28—Authorizing the C.N.O.R. to cross public road between Lots 7 and 8, Concession 3, Township of Hope, and rescinding Order No. 9537, dated February 14th, 1910.
- 11314—July 28—Authorizing the C.P.R. to construct, maintain and operate an industrial spur for John Moyses, Winnipeg, Manitoba.
- 11315—July 26—Authorizing the C.N.O.R. to cross public road between Lots 8 and 9, Concession 3, Township of Hope, Ontario.
- 11316—July 29—Disallowing the C.P.R. rate of 16c. per 100 lbs. on grain and grain products from Birtle, etc., to Fort William and Port Arthur, and requiring the C.P.R. to restore the rate of 15c. per 100 lbs., said rate to take effect not later than September 1st, 1910.
- 11317—July 29—Dismissing the application of the C.P.R. for an order settling the questions to be argued upon the Appeal to the Supreme Court, now pending in the said Court, from the Order of the Board No. 10349, dated April 26th, 1910.
- 11318—July 29—Authorizing the G.T.R. to construct branch lines or spurs to the premises of T. F. Firth & Sons, Limited, and Alexander Keith, at Mimico, Ontario.
- 11319—July 29—Ordering the Boston & Maine R. R. Co., to install a Whyte Signal Electric Bell within 60 days from the date of this Order at the Main Road crossing, Lennoxville, P.Q.
- 11320—July 29—Authorizing the C.P.R. to construct an additional track across the road allowance on the west boundary of the S. W. $\frac{1}{4}$ of Sec. 18-18-15 W. 2 M., at McLean, Sask.
- 11321—July 28—Ordering the G.T.R. to install a Whyte Signal Electric Bell at the crossing of the highway by the double track, between Lots 20 and 21, Concession 1, Township of Cramahe, within ninety days from the date of this Order.
- 11322—July 29—Authorizing the C.P.R. to construct an additional track across the road allowance on the west boundary of the S. W. $\frac{1}{4}$ of Section 32, Township 17, Range 7, west 3rd Meridian, at Ernford, Sask.
- 11323—July 28—Authorizing the municipality of Taber, Alta., to construct DeVeber Avenue, across the C.P.R., at Taber, Alta.
- 11324—July 30—Authorizing the C.N.O. Railway to construct its tracks across William, Burnham, Ontario, and D'Arcy Streets, and Cottesmore Avenue, in the town of Cobourg, Ontario.
- 11325—July 28—Authorizing the C.P.R. to use and operate certain bridges on its line of railway, on Chapleau, White River, Nepigon and Schreiber Sections.
- 11326—July 26—Refusing application of Montreal Board of Trade for Official Classification less-than-carload ratings on rubber goods, but that restriction of first class to "carriage and wagon" in Classification 14, be removed, and that in the forthcoming Supplement No. 3 to the said Classification, this item be changed so as to read,—"tires, solid, in packages, first class."
- 11327—August 2—Rescinding Order No. 10315, dated April 21st, 1910, authorizing the C.N.O.R. to construct a subway across public road, Lot 3, Concession 2, Township of Hope, Ontario.
- 11328—August 2—Approving Supplement No. 1 to Standard Passenger Tariff, C.R.C. No. 1, of the St. Maurice Valley Railway Company, applying between Shawinigan Falls and Grand Mere, P.Q.
- 11329—August 2—Amending Order No. 11141, dated June 27th, 1910, by inserting the words, "at its own expense" after the word "authorized" in the second line of the operative part of the said Order.
- 11330—August 2—Authorizing the city of Fort William, Ontario, to construct a subway for the Street Railway, under the tracks of the C.P.R., G.T.P.R., and C.N.R., at James Street, Fort William, Ontario, and rescinding Order No. 11220, dated July 18th, 1910.
- 11331—August 2—Authorizing the Province of Alberta to construct, and maintain, at its own expense, the highway crossing across the tracks of the Lacombe Branch of Calgary and Edmonton Railway Company, at Clive, Alta.
- 11332—August 2—Authorizing the G.T.P. Branch Lines Company, to cross, at grade, with its Yong-Prince Albert Branch, the C.N.R. industrial spur, at Prince Albert, Sask.
- 11333—August 2—Ordering the C.N.O.R. to provide and construct a suitable farm crossing for J. C. Scripture, at Lot 29, Concession 1, in the Township of Cramahe, Ontario.
- 11334—August 2—Approving and sanctioning the revised location of the C.N.O.R. Hawkesbury-Montreal Line through Township of Chatham, County of Argenteuil, mileage 6.08 to 9.36, from Hawkesbury.
- 11335—August 2—Authorizing the C.P.R. to construct, maintain, and operate an industrial spur for the Cranbrook Electric Light Company, Limited, at Cranbrook, B.C.
- 11336—August 2—Authorizing the C.P.R. to use and operate bridges on its Woodstock, Gibson, and St. John Sections.
- 11337—August 2—Authorizing the C.P.R. to construct a bridge over the Little Bow River, at mileage 28.33-28.57, Lethbridge to Aldersyde Branch.
- 11338—August 2—Authorizing the G.T.R. to take, for the purpose of construction of additional terminal facilities, the erection of new round house and shops, at Belleville Junction, certain lands in the Township of Thurlow, Ontario.
- 11339—July 30—Authorizing the Water Commissioners of the City of London, Ontario, to erect, place and maintain electric wires across the C.P.R. tracks at Oxford Street, London, Ontario.
- 11340—July 27—Authorizing the Western Canada Power Company to cross with its tracks the track of the Heaps Timber Company, railway at Ruskin, B.C.
- 11341—August 3—Authorizing the C.N.O.R. to construct its railway across the public road between Lots 8 and 9, Concession 4, Township Scarborough, Ont.
- 11342—August 3—Authorizing the C.P.R. to operate Bridges 0.61; 19.9; 19.3; 19.74; and 33.4 on its Edmundston Section.
- 11343—August 3—Approving the location of the Kettle River Valley Railway Company, from a connection with the Nicola, Kamloops and Simikameen Railway at Merritt, to a point 10 miles southwesterly.
- 11344—August 3—Extending until the 30th of September, 1910, the time within which the C.P.R. are required to complete the station at Eganville, Ontario, as ordered by Order No. 10563, dated May 10th, 1910.
- 11345—August 4—Authorizing the C.N.R. to open for traffic that portion of its line from Prince Albert to Shellbrook, a distance of 28 $\frac{1}{2}$ miles.
- 11346—August 4—Authorizing the C.N.O.R. to construct its lines of railway across the public road between Lots 2 and 3, Concession 2, Township of Hope, Ont.
- 11347—August 4—Approving the masonry diagrams of bridges on the 20th District, of the G.T.R., at over B. & T. tracks, mile-post 76.02; Avon River; Wharlie Creek; Thames River; and over public road at mile-post 154.05.
- 11348—August 3—Approving of the location of the C.N.R. through Townships 5 and 6, Ranges 19-26, west 2nd Meridian, Saskatchewan, mileage 147.14 to 203.85.
- 11349—Approving of the revised location of the G.T.P. Railway from N.W. $\frac{1}{4}$ of Section 24-53-17 to the S.W. $\frac{1}{4}$ of Section 2-53-19, west 5th Meridian, Alta.
- 11350—August 4—Authorizing the C.N.O.R. to cross public road between Concessions 2 and 3, Township of Hope, Ontario, and rescinding Order No. 10094, dated April 5th, 1910.
- 11351—August 2—Authorizing the Department of Public Works at its own expense, to construct proposed highway crossing over the C.N.R. in the N.E. $\frac{1}{4}$ of Section 29-19-21, west 2nd Meridian, Sask.
- 11352—August 4—Approving the location of Joliette & Lake Manuan Railway Company, from Joliette to Lake Manuan, P.Q.
- 11353—August 4—Extending until a month from the date of this Order the time within which the C.P.R. was required to install an electric bell at Maria Street Crossing, Peterborough, as ordered by Order No. 10771, dated June 4th, 1910.
- 11354—August 3—Authorizing the C.N.O.R. to cross public road between Lots 10 and 11, Concession A, Township of Haldimand, Ontario.
- 11355—August 4—Rescinding Order of the Board, No. 11238, dated July 15th, 1910, authorizing the C.P.R. to construct bridge over the Didgegnash River.
- 11356—August 4—Temporarily approving the agreement between the Bell Telephone Company, and the King Telephone Company, re telephone service.
- 11357—Temporarily approving the agreement between the Bell Telephone Company, and the Leeds and Frontenac Telephone Company, re telephone service.
- 11358—Temporarily approving agreement between the Bell Telephone Company, and Mallorytown Independent Telephone Association, re telephone service.
- 11359—August 4—Approving temporarily the agreement between the Bell Telephone Company and the Weedon Telephone Company, dated July 20th, 1910, re telephone service.
- 11360—August 4—Authorizing the G.T.R. to construct, maintain, and operate a branch line of railway to the premises of Edwin Steele, on the north half of Lot 10, Concession 4, Township of West Hawkesbury, Ontario.
- 11361—August 4—Approving temporarily the agreement between the Bell Telephone Company, and the Goderich Rural Telephone Company, dated July 5th, 1910, re telephone service.
- 11362—August 4—Authorizing the Algoma Central Railway Company, to construct a bridge over the Montreal River.
- 11363—August 5—Authorizing the Government of the Province of Saskatchewan to construct a highway across the tracks of the Wolsley-Reston Branch of the C.P.R. at S.W. $\frac{1}{4}$ of Section 30-16-9, west 2nd Meridian, Saskatchewan.
- 11364—August 5—Approving temporarily the agreement between the Bell Telephone Company, and the Lanark & Carleton Counties Telephone Company, dated June 21st, 1910, re telephone service.
- 11365—August 4—Authorizing the Volcanic Oil & Gas Company to lay and maintain a two-inch pipe under the W. E. & L. S. R. Railway Company, at Tecumseh Road, Township of Sandwich West, Windsor, Ontario.
- 11366 to 11369—August 3—Authorizing the city of Toronto to lay and maintain a water pipe under the C.P.R. at St. Clair Avenue, Van Horne Avenue, and Bathurst Street, and under the G.T.R. at St. Clair Avenue, Toronto, Ontario.
- 11370-71—August 3—Authorizing the Provincial Natural Gas & Fuel Company to lay and maintain an 8-inch gas pipe under the M.C.R.R. at Hellams Avenue, Welland, Ontario, and between Concessions 6 and 7, Township of Crowland, County of Welland.
- 11372—August 3—Authorizing the city of Toronto to lay and maintain a water pipe under the C.P.R. tracks at Ossington Avenue, North of Van Horne Avenue, Toronto, Ontario.
- 11373—July 14—Granting leave to the city of Winnipeg to erect, place, and maintain a conduit under the tracks of the C.P.R. at King Street, Winnipeg, Man.
- 11374—August 6—Ordering the C.P.R. to install an electric bell at the crossing of Norman Street, near mileage 2, Kenora Section, within 90 days from the date of this Order.
- 11375—August 6—Authorizing the C. W. and L. E. Railway Company to construct its railway across Baldoon Road, Bearline and Winterline, and along the Fourth Concession Road, in the Township of Dover East, Ontario.
- 11376—August 9—Authorizing the N. St. C. & T. Railway Company to construct its railway (Port Colborne Extension) across the tracks of the Canada Portland Cement Company, Township of Humberstone, Ontario.
- 11377—August 9—Authorizing the C.N.O.R. to construct bridge over Factory Creek, Township of Hamilton, Ontario.

- 11378—August 9—Authorizing the C.P.R. to construct bridge No. 91 over Colton Creek, Lake Superior Division, Temiscaming Branch.
- 11379—August 9—Authorizing the C.P.R. to construct, maintain, and operate a siding for the Hinde & Dauch Paper Company, at Parkdale Ontario.
- 11380—August 9—Authorizing the C.P.R. to construct, maintain, and operate an industrial spur for the Consolidated Mining & Smelting Company, near Boundary Falls Station, Yale District, B.C.
- 11381—August 4—Authorizing the G.T.R. to construct, maintain, and operate a branch line or siding with spur therefrom, into the premises of the Canadian Crocker-Wheeler Company, St. Catharines, Ontario.
- 11382—August 5—Relieving for the present, the Kingston and Pembroke Railway Company from keeping a watchman at crossing of Montreal Street, Kingston, Ontario.
- 11383—August 9—Authorizing the Volcanic Oil & Gas Company to lay and maintain a two-inch pipe line under the tracks of the P.M.R.R., at Tecumseh Road, Walkerville, Ontario.
- 11384—August 9—Authorizing the Municipal Council of the town of Wingham, Ontario, to lay and maintain a six-inch water pipe under the tracks of the G.T.R.
- 11385—July 27—Authorizing the Provincial Natural Gas & Fuel Company to lay and maintain an eight-inch pipe line under the G.T.R. spur line to the Dain Manufacturing Company, crossing Dain Avenue, Township of Humberstone, Ontario.
- 11386—August 6—Authorizing the C.N.O. Railway to cross the tracks of the G.T.R. and C.P.R., near Ottawa, Ontario, in the County of Carleton.

MARKET CONDITIONS.

Montreal, August 24th, 1910.

The pig-iron market of the United States continues dull and featureless. There is very little demand from any part of the country. Prices are now down to the low point of 1909, considering that the price of coke is 20 cents a ton higher, while that of ore is 50 cents per ton higher. These increased costs would mean that to give back the same profits to the furnaces, pig-iron should sell at about \$1.25 more per ton, whereas, it is selling at only about 75 cents a ton more. Sellers express the view that prices have now struck the bottom, and although they are receiving a large number of inquiries for delivery in 1910, they are not disposed to do business at present levels. It would seem, however, that they are prepared to do business at present prices for deliveries covering the next two or three months, or even in some cases, the balance of the year.

During the past week has been issued an estimate of the business of the United States Steel Corporation, which will be of interest as indicating what is taking place in the leading producing company. With blast furnaces operating not much over 70 per cent. of maximum, it is likely that earnings in the first quarter will equal \$35,000,000. This will show a surplus over the preferred stock dividends, and the 5 per cent. on the common stock. Comparing profits of \$35,000,000 for the 3rd quarter of 1910, with the same quarter of previous years, we have \$38,000,000 in 1909, \$27,000,000 in 1908, \$44,000,000 in 1907, \$38,000,000 in 1906, \$31,000,000 in 1905, \$19,000,000 in 1904, \$32,000,000 in 1903, \$36,000,000 in 1902, and \$27,000,000 in 1901. It is considered that this showing will be regarded as satisfactory by conservative steel men, who are fully aware that shipments have fallen off materially, and that prices are much lower than they were in either the first or second quarters of the present year. The evidence of the manner in which the estimate is presented is that there will not be a very marked improvement in the market during the remainder of the year.

Advices from Great Britain show that the market there continues about as previously, demand being moderately good, and prices showing almost no fluctuation.

The announcement that a practical agreement has been reached by Scottish steel makers in the discussion of various points of difference which threatened the existence of the combine, is of importance both to makers and to consumers. It has been more than once threatened that consumers would lay down their own plate mills, as was done on a previous occasion in the case of bolts and rivets, rather than go on under conditions which impose on them a heavy handicap, and it is believed that definite steps would have to be taken but for the expectation that associations would reach a reasonable basis of agreement. The normal output of steel in Scotland is about 1,000,000 tons per annum, of which about one-third is consumed by local shipbuilders, one-sixth by other consumers, and about one-half for market abroad.

The local market shows absolutely no change. The fall trade has not yet opened up, although a certain amount of inquiry is going on. Dealers, however, admit that the market is dull, and that the tonnage changing hands is exceedingly small. The Canadian situation is influenced to a considerable extent by the situation in the United States. This, at the present time, as all know, is dull and lacking in interest.

- Antimony.**—The market is steady at 8c. to 8½c.
- Bar Iron and Steel.**—The market holds dull and steady. Bar iron, \$1.00 per 100 pounds; best refined horseshoe, \$2.10; forged iron, \$2.05; mild steel, \$1.95; sleigh shoe steel, \$1.90 for 1 x ¾ base; tire steel, \$2.00 for 1 x ¾-base; toe calk steel, \$2.40; machine steel, iron finish, \$2.00; imported, \$2.05.
- 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 paper will be the largest in the history of the country. Prices on foreign 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:—\$1.35 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 ¼ cents extra, or 10c. per bbl. weight.
- Chain.**—The market is unchanged, being now per 100 lbs., as follows:—½-in., \$5.20; 5-16-in., \$4.70; ¾-in., \$4.90; 7-16-in., \$3.65; 1-in., \$3.55; 9-16-in., \$3.45; 1¼-in., \$3.40; 1½-in., \$3.35; 1¾-in., \$3.35; 2-in., \$3.35.

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 ¼ f.o.b., cars, Montreal

Copper.—Prices are strong at 13¼ to 14c.

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 5,000, 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.

Galvanized Pipe.—(See Pipe, Wrought and Galvanized).
Iron.—The market is steady and prices unchanged. Following are the prices, on cars, ex-wharf, Montreal:—No. 1 Summerlee, \$20.50 to \$20.75 per ton; selected Summerlee, \$20 to \$20.25; soft Summerlee, \$19.50 to \$19.75; Carron, special, \$20 to \$20.50; soft, \$19.50 to \$20; Clarence, \$17.25 to \$17.50; Cleveland, \$17.25 to \$17.50 per ton.

Laths.—See Lumber, etc.

Lead.—Prices are easier, at \$3.35 to \$3.45.

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, 33 to 45c. each, on a 5c. 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 5c. 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.

Nails.—Demand for nails is steady and prices are: \$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:—\$33 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.

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; ½-inch, \$5.50, with 50 per cent. off for black, and 44 per cent. off for galvanized; ¾-inch, \$8.50, with 60 per cent. off for black, and 50 per cent. off for galvanized. The discount on the following is 71½ per cent. off for black, and 61½ per cent. off for galvanized; 1-inch, \$11.50; 1-inch, \$16.50; 1¼-inch, \$22.50; 1½-inch, \$27; 2-inch, \$36; 2½-inch, \$57.50; 3-inch, \$75.50; 3½-inch, \$95; 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.

Rails.—Quotations on steel rails are necessarily only approximate and depend upon specification, quantity and delivery required. A range of 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.

Railway Ties.—See Lumber, etc.

Roofing.—Ready roofing, two-ply, 70c. per roll; three-ply, 95c. per roll of 100 square feet. Roofing tin caps, 6c. lb.; wire roofing nails, 5c. lb. (See Building Paper; Tar and Pitch; Nails, Roofing).

Rope.—Prices are steady, at 9c. per lb. for sisal, and 10½c. for Manila. Wire rope, crucible steel, six-strands, nineteen wires; ¼-in., \$2.75; 5-16, \$3.75; ¾, \$4.75; 1, \$5.25; 1½, \$6.25; 2, \$8; 3, \$10; 4-in., \$12 per 100 feet.

Spikes.—Railway spikes are steady, at \$2.45 per 100 pounds, base of 5¼ x 9-16. Ship spikes are steady at \$2.85 per 100 pounds, base of ¾ x 10-inch, and ¾ x 12-inch.

Steel Shafting.—Prices are steady at the list, less 25 per cent. Demand is on the dull side.

Telegraph Poles.—See Lumber, etc.

Tar and Pitch.—Coal tar, \$3.50 per barrel of 40 gallons, weighing about 500 pounds; roofing pitch, No. 1, 70c. per 100 pounds; and No. 2, 55c. per 100 pounds; pine tar, \$8.50 per barrel of 40 gallons, and \$4.75 per half-barrel; refined coal tar, \$4.50 per barrel; pine pitch, \$4 per barrel of 180 to 200 pounds. (See building paper, also roofing).

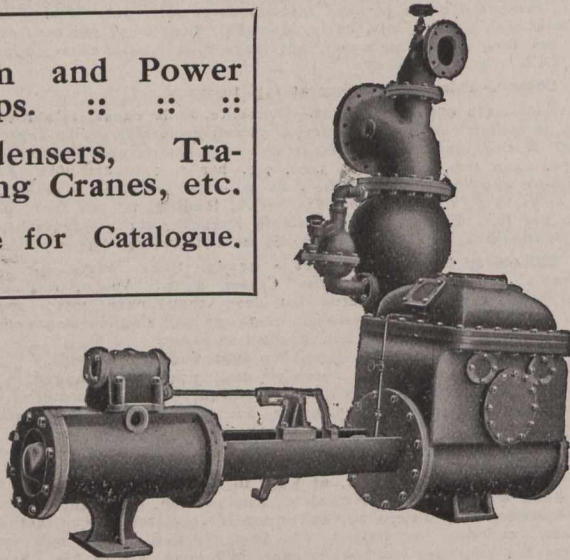
Tin.—Prices are firm, at \$34 to \$34.50.

Zinc.—The tone is easy, at 5¼ to 6c.

CAMP SUPPLIES.

- Beans.**—Prime pea beans, \$2 to \$2.25 per bushel.
- Butter.**—Fresh made creamery, 22¼ to 23½c.
- Canned Goods.**—Per Dozen.—Corn, 80 to 85; peas, \$1.05 to \$1.15; beans, 85c.; tomatoes, 85 to 90c.; peaches, 25, \$1.05, and 35, \$2.65; oears, 25, \$1.60, and 35, \$2.30; salmon, best brands, 1-lb. talls, \$1.87½, and flats, \$2.02½; cheaper grades, 95c. to 1.65.
- Cheese.**—The market ranges from 10¼ to 11½c., covering all Canadian makes.
- Coffee.**—Mocha, 20 to 25c.; Santos, 15 to 18c.; Rio, 10 to 12c.
- Dried Fruits.**—Currants, Filiatras, 5¼ to 6¼c.; choice, 8 to 9c.; dates, 4 to 5c.; raisins, Valentias, 5 to 6¼c.; California, seeded, 7½ to 9c.; Evaporated apples, prime, 8 to 8½c.
- Eggs.**—No. 1 eggs are 19 to 20c.; selects, 22 to 25c.
- Flour.**—Manitoba, 1st patents, \$6.30 per barrel; and patents, \$5.80; strong bakers', \$5.60.
- Molasses and Syrup.**—Molasses, New Orleans, 27 to 28c.; Barbadoes, 40 to 45c.; Porto Rico, 40 to 43c.; syrup, barrels, 3½c.; 2-lb. tins, a dozen to case, \$2.50 per case

Steam and Power Pumps. :: ::
 Condensers, Travelling Cranes, etc.
 Write for Catalogue.



The Smart-Turner Machine Co., Ltd.
 HAMILTON - - CANADA

Potatoes.—Per 90 lbs., good quality, 65 to 75c.
 Rice and Tapioca.—Rice, grade B, in 100-lb. bags, \$2.75 to \$2.80; C.C., \$2.65. Tapioca, medium pearl, 5½ to 6c.
 Rolled Oats.—Oatmeal, \$2.20 per bag; rolled oats, \$2, bags.
 Sugar.—Granulated, bags, \$5.05; yellow, \$4.65 to \$5. Barrels 5c. above bag prices.
 Tea.—Japans, 20 to 38c.; Ceylons, 20 to 40c.; Ceylon greens, 19 to 25c.; China, green, 20 to 50c.; low-grades, down to 15c.
 Fish.—Salted.—Medium cod \$7 per bbl.; herring, \$5.25 per bbl.; salmon, \$7 per half barrel. Smoked fish.—Bloaters, \$1.10 per large box; haddies, 8c. per lb.; kippered herring, per box, \$1.20; new smoked herring, 13c. per box.
 Provisions.—Salt Pork.—\$24 to \$31 per bbl.; beef, \$18 per bbl.; smoked hams, 17 to 21c. per lb.; lard, 15½ to 17c. for pure, and 12½ to 14c. per lb. for compound.

* * * *

Toronto, August 25th, 1910.

The building trade is very active, and the demand for building material is still brisk. Stone, lime, and sand are moving easier, but the demand is still a little greater than the supply.
 Camp supplies are, and will increase, in price.
 The following are wholesale prices for Toronto, where not otherwise explained, although for broken quantities higher prices are quoted:
 Antimony.—Trade is quiet, price unchanged at \$8.50.
 Axes.—Standard makes, double bitted, \$8 to \$10; single bitted, per dozen, \$7 to \$9.
 Bar Iron.—\$2.05 to \$2.15, base, per 100 lbs., from stock to wholesale dealer. Free movement
 Bar Mild Steel.—Per 100 lbs., \$2.15 to \$2.25. Sleigh shoe and other take same relative advance.
 Boiler Plates.—¼-inch and heavier, \$2.20. Boiler heads 25c. per 100 pounds advance on plate. Tank plate ¾-16-inch, \$2.40 per 100 pounds.
 Boiler Tubes.—Orders continue active. Lap-welded, steel, 1¼-inch, 10c.; 1½-inch, 9c. per 1000'; 2-inch, \$8.60; 2¼-inch, \$10; 2½-inch, \$10.60; 3-inch, \$12.10; 3½-inch, \$15.30; 4-inch, \$19.45.
 Building Paper.—Plain, 7c. per roll; tarred, 35c. per roll. Demand is moderate.
 Bricks.—In active movement, with very firm tone. Price at some yards \$9.50, at others, \$10.00 to \$11.00 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., 70c., until further notice, per ton of 2,000 lbs., 1-inch, 2-inch, or larger, price all the same. Rubble stone, 52c. per ton, Schaw station, and a good deal moving. Broken granite is selling at \$2 per ton for good Oshawa.
 Cement.—The G.T.R. strike being broken, shipments are resumed. Car lots, \$1.75 per barrel, without bags. In 1,000 barrel lots \$1.60. In smaller parcels \$1.00 is asked by city dealers. Bags, 40c. extra. Demand constant.
 Coal.—Anthracite, egg, and chestnut sizes, \$6.75 per ton, net, and pea coal to \$5.75 per ton. 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, \$2.75 to \$2.80; mine run, \$3.65 to \$2.70; slack, \$2.75 to \$2.85; lump coal from other districts, \$2.55 to \$2.70; mine run 10c. less; slack, \$2.60 to \$2.70; canal coal plentiful at \$7.50 per ton; cook, Solvey foundry, which is largely used here, quotes at from \$4.75 to \$6.00; Reynoldsville, \$4.00 to \$5.10; Connellsville, 72-hour coke, \$5.25.
 Copper Ingot.—A very large volume of business is being done, but the market is weaker at \$15.25 to \$14.50. Production goes on at a rapid rate.
 Detonator Caps.—7c. to \$1 per 100; case lots, 7c. per 100; broken quantities, \$1.
 Dynamite, per pound, 21 to 25c., as to quantity.

"ORB" and "REDCLIFFE" Corrugated Iron

Well Galvanized, soft, uniform in weight

John Lysaght, Limited
 Makers, Bristol

A. C. Leslie & Co., Ltd.
 Montreal

Felt Roofing.—A very good volume of trade is going on at \$1.80 per 100 lbs. as before.
 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.—¼-inch, \$5.75; 5-16-inch, \$5.15; ¾-inch, \$4.15; 7-16-inch, \$3.95; ½-inch, \$3.75; 9-16-inch, \$3.70; ¾-inch, \$3.55; ¼-inch, \$3.45; ¾-inch, \$3.40; 1-inch, \$3.40, per 100 lbs.
 Iron Pipe.—A steady request at former prices:—Black, ¾-inch, \$2.03; ¾-inch, \$2.25; ½-inch, \$2.63; ¾-inch, \$3.28; 1-inch, \$4.70; 1½-inch, \$6.41; 1¾-inch, \$7.70; 2-inch, \$10.26; 2½-inch, \$10.39; 3-inch, \$21.52; 3½-inch, 27.08; 4-inch, \$30.78; 4½-inch, \$35.75; 5-inch, \$39.85; 6-inch, \$51.70. Galvanized, ¼-inch, \$2.86; ¾-inch, \$3.08; ½-inch, \$3.48; ¾-inch, \$4.43; 1-inch, \$6.35; 1½-inch, \$8.66; 1¾-inch, \$10.40; 2-inch, \$13.86, per 100 feet.
 Pig Iron.—We quote Clarence at \$20.50, for No. 3; Cleveland, \$20.50; Summerlee, \$22; Hamilton quotes a little irregular, between \$19 and \$20. The market unchanged and quiet.

Lead.—A very fair demand exists, at an unchanged price of \$3.75 to \$3.85. A better feeling exists, however.
 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, supply insufficient, railways blamed.
 Lumber.—A brisk demand continues for all descriptions, and prices are fully maintained. Pine is good value at \$32 to \$40 per M. for dressing, according to width required; common stock boards, \$28 to \$33; 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 is in demand and held quite firmly, we quote \$17.50 to \$18; spruce flooring in car lots, \$22 to \$24; shingles, British Columbia, are steady, we quote \$3.10; lath, No. 1, \$4.60; white pine, 48-inch, No. 2, \$3.75; for 32-inch, \$1.85 is asked.
 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, \$3.50 per barrel. Demand moderate.
 Plaster of Paris.—Calced, 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.—An active demand; 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 10 x 16 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 fairly busy.
 Rope.—Sisal, 9½c. per lb.; pure Manila, 10½c. per lb., Base.
 Sand.—Sharp, for cement or brick work, \$1.05 per ton f.o.b., cars, Toronto siding.
 Sewer Pipe.—

	4-in.	6-in.	9-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	.90	1.35	2.70	3.40	4.50	14.65
Double junctions	1.50	2.50	5.00	8.50

Provincial Steel Co. LIMITED.

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DEPARTMENT A.

MANUFACTURERS OF RE-ROLLED RAILS

Ranging in size from 20 to 70# per yard inclusive.