

PAGES

MISSING

The Canadian Engineer

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TORONTO, CANADA, AUGUST 28th, 1908.

No. 35

The Canadian Engineer

ESTABLISHED 1893

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TO OUR READERS.

If you are coming to the Canadian National Exhibition
in Toronto in September, we would be pleased to have you
call on us. Have your mail forwarded in care of our office
if you do not know where you will be staying. It will be
pleasure to look after it for you.

STATIONARY ENGINEERS' EXAMINING BOARD.

At the last session of the Legislative Assembly for Ontario an Act was passed requiring that after January 1st, 1909, no person, not a holder of a certificate of qualification from the Provincial Board of Examiners, shall operate or have charge of any steam plant in the Province of Ontario.

The Government has recently appointed the chairman of the board, and it is presumed the other members of the board will be selected and arrangements for the issuing of certificates completed.

The present Act represents the method used by the Government to raise the standard of professional skill among stationary engineers without fostering a closed corporation. Some years ago a body of men were anxious that these examinations be placed in the hands of a society or association; others objected, claiming that this might limit the number of engineers without raising their qualifications. The course adopted by the Government is the most natural and satisfactory one.

The good results to be secured by this measure will be delayed by two clauses which provides that engineers now in employment and engineers of two years' experience shall be granted certificates. Among this class there will doubtless be a number who could not qualify under the regulations that the new board will doubtless prepare.

There are already about four thousand certificates awaiting inspection, and it is expected that there will be between eight and nine thousand applications altogether. Three application forms are used, one stating that the applicant has been in charge of an engine of 25 horse-power or over on and since April 20, 1907, the date of the passing of the Act; the second for a man who is a member of the Ontario Stationary Engineers' Association, and the third for a man of two years' experience.

BUILDING INSPECTION.

In many of our towns and cities the city engineer's office issues the building permits. Too frequently these permits are issued without the proper regulations. The recent disaster in London leads one to remark that nothing but short-sightedness on the part of the municipality is responsible. Time and again they have had warnings that their building regulations and inspection were defective.

It is very necessary that proper building regulations be prepared and made readily available. But good regulations will be of little value unless there be also thorough and informed inspection; inspection of new buildings during erection of old buildings under alteration and of public and semi-public buildings and of warehouses at regular intervals.

It will not be necessary to rebuild old buildings, but it would be quite possible to prevent the heavy loading of weak floors and the making of our warehouses, firetraps.

ONTARIO POWER SITUATION.

The outlook for a speedy completion of the Ontario power lines is not bright. The Government and the contractor agreed to sign a contract some weeks ago, but as yet no contract has been signed.

The Hamilton council have voted in favor of securing their power from a private corporation. Stratford, Galt and Brantford are not very enthusiastic. If the municipalities are going to build this line definite contracts must be entered into at once, else the benefit of a low market will not be secured.

EDITORIAL NOTE.

Fort William is growing in a very modern way. One warehouse now building is to cost \$10,000, and a block of commercial buildings \$100,000. The building permits issued so far this year amount to \$1,230,000.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

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

5152—August 7—Granting leave to the Northern Pipe Line Co. to lay a six-inch pressure pipe under the track of the C.P.R. in the immediate vicinity of the town of Wallaceburg, Ont.

5154—August 11—Authorizing the Bell Telephone Co. to erect, place and maintain its aerial wires across the tracks of the G.T.R. at Elizabeth Street, St Marys, Ont.

5155—August 11—Authorizing the C.P.R. to open for the carriage of traffic that portion of the diversion of the Edmundston branch of the N.B.R. Co. between mileage 33.1 and 33.7 and the bridge at Grand River on the said Edmundston branch.

5156—August 11—Granting leave to the rural municipality of Wallace to erect, place, and maintain its telephone wires across the track of the C.P.R. at public crossing half mile east of Hargrave, Man.

5157—August 11—Granting leave to the rural municipality of Wallace to erect, place, and maintain its telephone wires across the track of the C.P.R. two miles east of Elkhorn, Man.

5158—August 11—Granting leave to the rural municipality of Wallace to erect, place, and maintain its telephone wires across the track of the C.P.R. at public crossing three miles east of Hargrave, Man

5159—August 11—Granting leave to the rural municipality of Wallace to erect, place, and maintain its telephone wires across the track of the C.P.R. at public crossing two miles west of Hargrave, Man.

5160—August 11—Granting leave to the rural municipality of Wallace to erect, place, and maintain its telephone wires across the track of the C.P.R. between Sections 28 and 29, Township 19, Range 26, one mile west of Virden, Man.

5161—August 11—Granting leave to the Uxbridge and Scott Telephone Co to erect, place and maintain its aerial wires across the track of the G.T.R. at 7th Concession of Uxbridge, or Main Street, Uxbridge, Ont.

5162—August 13—Authorizing the C.P.R. to reconstruct bridge No. 73.1 on the Laggan section of its line of railway in the Province of Alberta.

5163—August 13—Authorizing the C.P.R. to reconstruct bridge No. 37.0 on the White River section of its line, in the Thunder Bay district, Province of Ontario.

5164—August 12—Authorizing the municipality of the parish of Notre Dame de Perpetuel Secours du Charney, P.Q., to construct, at its own expense, a highway across the right of way and track of the G.T.R. on the property of Pierre Fontaine.

5165—August 12—Approving of the C.N.O. Railway Company's Standard Passenger Tariff, C.R.C. No. 26, cancelling its Standard Passenger Tariff No. 1, covering its line of railway between Toronto and Sudbury, Ont.

5166—August 12—Approving of the C.N.O. Railway Company's new Standard Freight Tariff, C.R.C. No. 74, cancelling its Standard Freight Tariff, C.R.C. No. 1, covering its line of railway between Toronto and Sudbury, Ont.

(Continued on Page 602.)

STONE ARCH CULVERT.

These days we hear a great deal about permanent structures and the use of cement for such works.

We reproduce here a photo of a stone arch culvert on Yonge Street at Newtonbrooke, about eight miles north of Toronto.

Yonge Street was used as a highway before 1800, and during the War of 1812-15 was improved as a military road.

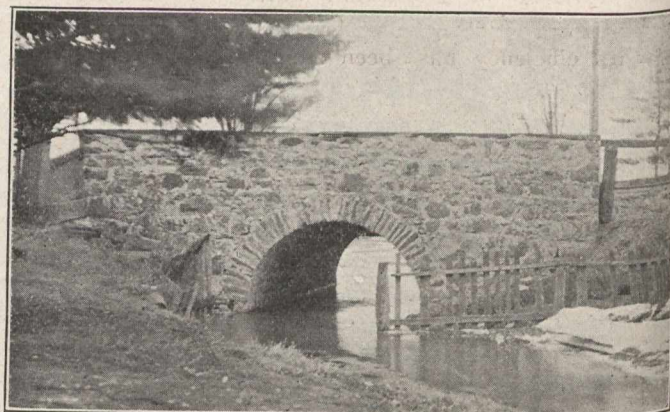


Photo by E. Gilson, Willowdale.

Stone Arch Culvert.

Later, about 1835, part of the road was macadamized, and a number of large stone culverts built, among them the one shown in the illustration.

The culvert is 42 feet long and carries not only the highway traffic but also the roadbed of the Metropolitan Street Railway, which runs the heaviest electric rolling stock used in Canada.

At the water line the opening is 10 feet wide and rises 7 feet.

Seventy-three years' exposure to the elements has done but little injury to the structure. It is said that during that period the arch proper has been neither repaired nor patched. Its first cost may have been large but it certainly illustrates the value of erecting permanent structures.

RAILROAD EARNINGS.

The following are the latest figures:

	Week Ending:	1907.	1908.	Change.
C.N.R.	Aug. 14	\$ 190,800	\$ 167,600	—\$ 23,200
C.P.R.	Aug. 14	1,546,000	1,420,000	— 126,000
G.T.R.	Aug. 14	910,996	778,936	— 132,060
T. & N. O.	Aug. 14	15,988	18,053	+ 2,065
Toronto St. Ry. Aug. 14		67,140	66,917	— 223

A COLD FACT

☞ During the First Six Months of 1908 the subscription receipts on the Canadian Engineer in cold cash were 50% more than during the twelve months of 1907.

☞ There is only one explanation--It is this--We are giving the civil engineers and contractors of Canada the kind of information they are looking for.

☞ All readers of the Engineer possess purchasing power in themselves--the kind of subscriber the intelligent advertiser is looking for.

REINFORCED CONCRETE AND ITS PRACTICAL APPLICATION.

By Mr. Moritz Kahn.

Various engineers in Great Britain have already used reinforced concrete to so great an extent that it would seem unnecessary to dwell upon any lengthy argument advising the use of this material in buildings and other constructions.

Its efficiency has been thoroughly demonstrated, and it is now recognized as a permanent method of construction, proof against the deteriorations to which other materials are subject. The fire at Baltimore gave evidence of its being fireproof; the earthquake at San Francisco showed it, to a great extent, to be proof against earthquake; innumerable instances have convinced users that it is rust-proof; and the Pantheon at Rome proves it practically everlasting.

A reinforced concrete structure, cast as a monolith, is more rigid than steel, where rigid connections can only be secured at great cost. The corresponding strength obtained from this cause is one of the reasons for the economy secured in its use, and in the hands of capable designers, girders and other structures can be made as strong in reinforced concrete as in structural steel. Finally, what is most advantageous about it is that its strength continually increases with age.

An engineer, in deciding upon the use of any building material, after satisfying himself as to its suitability and efficiency, inquires as to its probable cost. In all important structures, and in all buildings where steel framing might be used, reinforced concrete will prove an economical structural material. In this country, however, there are many places where it would be of no advantage whatever to have a steel or concrete frame building, so far as the external walls are concerned, on account of the thickness of the walls required by the building by-laws. If the external walls of the building are to be built in a structural frame, the filling-in should be made of thin panels, and where reinforced concrete is used, these panels need not be more than five inches thick. If, on the other hand, brick panels are used, a nine-inch thickness will suffice. As a rule, it is necessary to secure permission from the local authorities whenever it is desired to erect a construction as outlined.

It is erroneous to say that reinforced concrete will always prove the cheapest method of construction. As already stated, there are instances where it is not so cheap, and engineers soon recognize such cases. Middle-sized and small residential buildings, small manufacturing buildings, and the ordinary one-storey type of building, will show very little saving when reinforced concrete is used in their construction. A low retaining wall six feet high would be cheaper in brick than in reinforced concrete, inasmuch as it would require a comparatively thin brick wall to withstand the strain, but a retaining wall over ten feet high could easily be constructed in reinforced concrete cheaper than in brick. Isolated girders and roof trusses high in the air will invariably prove cheaper in steel than in reinforced concrete; but a steel structure, after having been built, will always require a certain amount of upkeep, and the maintenance charges thus entailed will have considerable influence on the total cost. In brief, though the material under discussion may not always be the cheapest form of construction, such as the additional safeguard against fires, with a corresponding efficiency in one's plant, the reduction in fire insurance premiums, and also the reduction in maintenance charges.

One of the reasons for the popularity of reinforced concrete lies in the fact that the constituents from which

(Extract from an article read at Glasgow 18th February, 1908.)

it is made can easily be obtained in almost any locality. In every part of England there are cement mills, and it is never necessary to look far for sand and crushed stone or ballast. These materials being found near the site produce a considerable decrease in the freight charges of building materials. The only remaining constituent which need be brought any distance is the reinforcing steel, but such steel will only be about 20 per cent. of the weight of the material which would be used in an ordinary steel structure, and consequently the freight is reduced in accordance therewith.

In the selection of materials, the question is often asked whether preference should be given to either crushed stone or ballast. Engineers are wont to object to the use of the latter, on the ground that the surfaces are generally round and too smooth. It has often been demonstrated that round, smooth ballast gives just as strong a concrete as crushed stone. This statement might be limited by the fact that in the early stages, say, at the end of two weeks, crushed stone concrete will be found to be a little stronger than ballast concrete, but at the end of thirty days ballast concrete is just as strong as stone concrete, and from that time on its strength begins to surpass it.

Ballast is often considered unsatisfactory as a fire-resisting material. At a fire test made recently, it was found that ballast concrete would not go through the ordeal. The ballast used in that test was uncrushed, and portions of it were of considerable size. Large stones when heated to a certain temperature will fly apart, owing to the internal strains existing therein, but small stones heated to the same degree will not disintegrate. If the ballast used in that test had either been crushed, or screened to pass a $\frac{3}{4}$ -inch mesh, the floor slab in question would have successfully withstood the test. A similar test was made by myself for the New York City Fire Department, in 1904, using crushed ballast concrete, with satisfactory results.

With reference to sand used in concrete, some engineers specify that it shall be sharp and coarse. It is, however, very probable that these specifications will soon be eliminated. It has been recently proved that a moderately fine sand will give a stronger concrete than sharp, coarse sand. In the selection of this material, however, it is necessary to discover whether it contains chemicals which might act on the cement. Sand taken from beds in contact with impure water kills the action of the cement, and should be condemned. Pit or bank sand is a very satisfactory kind to use. The cement should be of the very best grade, and should be subjected to many mechanical tests during the progress of the work. There is no necessity to dwell upon this material, as the products now being turned out by the various leading English mills are of such excellent grades that very little difficulty should be experienced in securing a proper quality. In this respect English cements are probably the best in the world.

The handling and mixing of concrete is a feature which to a great extent, governs its cost. Many engineers object to the use of machine mixers. The use of a good batch machine mixer is advisable, however, on every large construction. When the concrete is mixed by hand it is turned from six to eight times, but when a machine mixer is used the concrete is turned at least twenty times in a much shorter period, and at a considerable saving in expense. In truth, a good machine mixer should actually be specified, provided the size of the construction and the amount of concrete to be mixed warrant the expense of installing such a plant. In general, it will be found that in all constructions involving a quantity less than 400 or 500 yards the concrete will be more economically mixed by hand than by machine, but in larger constructions the reverse is true.

One of the most important matters in connection with reinforced concrete is that concerning its inspection or supervision. An inspector who is too fastidious can do quite as much harm by over-inspection as one who

does not sufficiently perform his duties. An inspector should be the intermediary between the owner and the contractor, and it should be his duty to see that everything runs smoothly, his main object being to keep the interests of the contractor in line with those of the owner, thereby securing the best results. An over-anxious inspector is apt to disgust the contractor, causing him to lose interest in the construction, with the result that poor work must follow. It is assumed, of course, that good materials and workmanship are always to be demanded.

The following instructions for inspecting ferro-concrete construction, written for the benefit of our inspectors, may be of interest:—

“Centering and supports must be properly braced and cross-braced in two directions. False work or centering should be removed with great care, and without injuring the construction by dropping heavy sections thereon. No centering should be removed in less than three weeks. A good rule governing the length of time for the centering to remain in position is two days for each foot of span; that is, a span of 12 feet should remain centered for 24 days, and a span of 16 feet should remain centered for 32 days. The supports should under no consideration be removed in less than three weeks. No centering need remain in position longer than 45 days, no matter how great the span. Temporary shores should be placed under all main girders which might be subjected to heavy loads during the course of construction. Where centering supports come on soft ground, a heavy plank or timber should be placed underneath them to prevent their being forced into the earth. Reinforcing steel should be free from oil and paint. A slight film of rust is not objectionable, but all loose scales should be cleaned off with a stiff wire brush.

“Samples of materials used should be subjected to mechanical tests. Only clean water, free from acids and strong alkali, should be used in the mixing. The resultant should be that known as a wet mixture rather than that termed a dry mixture. No concrete which has once begun to set should be deposited thereafter in the forms. Sections which have recently been concreted should not be travelled over. Concreting should never be carried on in freezing weather. In case the concrete, after having been deposited, should become frozen, the centering should never be removed until it is absolutely certain that all the frost has disappeared.”

Lack of time prevents the consideration of these instructions in more detail, but a similar set of instructions can be drawn up by any engineer in charge of this form of construction. Probably one-half of the responsibility of a reinforced concrete structure depends upon the inspector in charge, and it is important that he should be as familiar with the class of work as the foreman who is to carry it out, and, at the same time, he should bear in mind the objection to his being too theoretical in his inspection; the practical man will secure better results.

Since the Royal Institute of British Architects thought that reinforced concrete, as a structural material, was of sufficient value to devote to it the attention and research of a special committee, which committee summarized the general principles for designing reinforced concrete, and published formulæ recommended by them, there is no necessity for me to burden this paper with any mathematical problems. Nor is it necessary to attack the methods of calculations employed by the patentees of the various systems, unless such calculations are based purely upon empirical formulæ. Empirical formulæ should not now be used, for sufficient progress has been made in scientific research to establish definite results, and, though various authors who do not employ empirical formulæ differ widely in their methods of calculation, it will usually be found that there is very little difference in the result, no matter what method is used.

The theory and calculations adopted by the author are practically the same as those adopted by the committee appointed by the Royal Institute of British Architects. However, in using these formulæ it must be borne in mind that no method of designing beams, based only on the calculations of the bending strain, can be correct. Such a design assumes that the concrete will, within itself, resist all the shearing strains, and all internal tensile strains resulting therefrom. That concrete is incapable of doing this is now generally recognized, and in proper designing provision is made for overcoming all internal strains, whether they occur at the end of a beam in the web, or at the centre of the beam in the bottom flange.

In brief, I would state that reinforced concrete is, in my opinion, the best form of construction when properly handled, and the worst when improperly handled. Such being the case, it behoves the owner and the architect to ensure that only the best class of contractor is employed on his work. Reliable contractors can only afford to carry out work which will ensure them a fair amount of profit, and if, by the adoption of reinforced concrete, the owner is saved 10 per cent. of the cost of construction, it is advisable to grant the contractor any extra saving, so as to ensure his giving a construction which will prove satisfactory in every respect.

When owners and engineers realize this point, and act accordingly, reinforced concrete will then reach that position in the category of structural materials where it justly belongs.

Probably every engineer recognizes the extensive field wherein reinforced concrete can be used. It immediately recommends itself for use in all harbor works and waterworks in general. Buildings of every description have already been, and are being, built with it, and engineering problems of the most complicated character are successfully carried out by its adoption.

RUSTING OF REINFORCING STEEL.

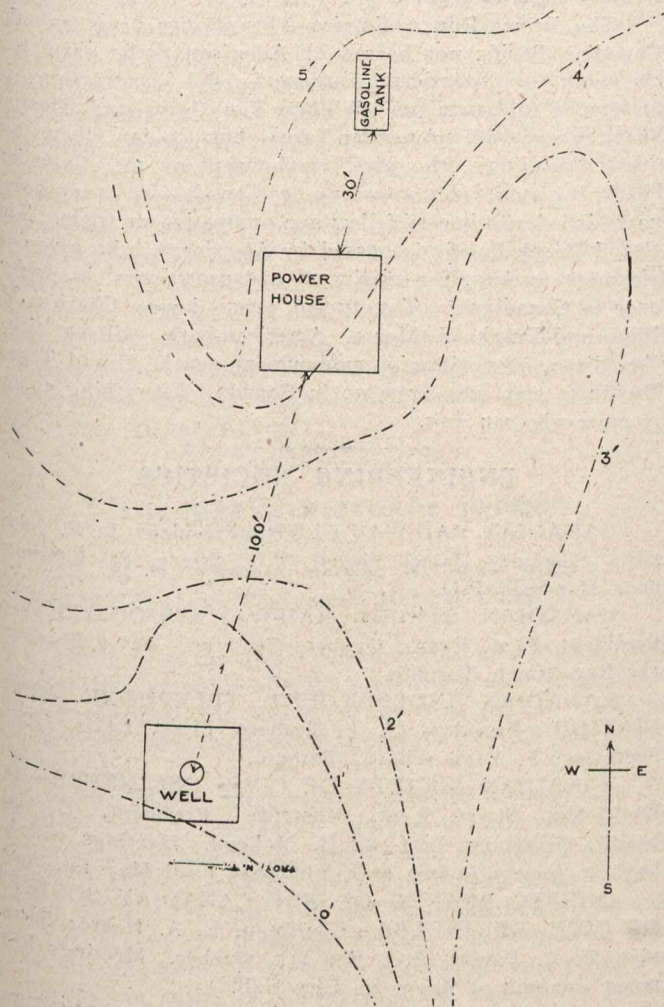
During 1905 Mr. J. M. Braxton, United States assistant engineer at Key West, Florida, prepared four blocks of coral sand and broken brick concrete, in each of which was embedded a ½-inch steel rod. Two of these were placed in about four feet of water in the ocean and two in a dry-closet in the testing laboratory and left over a year. The blocks were then broken and the rods carefully examined for rust. The rod in one of the blocks which had remained in the dry-closet showed signs of rusting, but the other three rods were as bright and smooth as when they were placed in the blocks. The test was on so few specimens, however, that it was decided the next year to make more extensive tests. The results of these latter have just been reported to the United States engineer officer in charge of fortification works on the east coast of Florida. The blocks tested were 12 in. by 12 in. by 6 in., made under usual working conditions of one part Portland cement, three parts sand and five parts broken brick. Embedded in the centre of each block was ⅝-in. diameter twisted-steel rod 8 in. long. Fifteen sets of two blocks each were made, ten with the coral sand, or disintegrated coral rock, common to the beaches of the Florida coast, and five with ordinary silica sand. Of the ten coral sand blocks, five were with brick crushed to pass through a 1-in. ring and five through a 2-in. ring; all the silica sand blocks were made with 1-in. crushed brick aggregate. Some of the rods were dipped in either a fresh or salt water grout before being embedded in the block and some were put into the concrete clean and dry. Of every set half of the blocks were placed in the ocean after a twenty-four hour set and half were kept in the air without roof protection. After one year and twenty-one days the blocks were all broken and the rods examined for evidences of rust. It is a fact worthy of note that all the blocks allowed to remain in sea water show no

signs of rusting in the rods, but that all those allowed to set in the air show some rusting regardless of the make-up of the concrete, although the smaller aggregate silica sand and fresh water seem to be a nearly perfect protection.

PECULIAR INSTANCE OF CONTAMINATION OF A WELL WATER.*

Dr. W. P. Mason.

The Anti-Tuberculosis Association of Wellingford, Conn., possesses a six-inch well drilled through red sand-rock to the depth of sixty-six feet and water raised therefrom by windmill was formerly of excellent quality. During the summer of 1904 an electric light plant was erected, which was sup-



plied with power from a gasoline engine. The necessary store of gasoline was contained in a cylindrical tank of riveted steel, three feet in diameter and ten feet long. This tank was buried just under the ground surface at a point 130 feet distant from the well, and two gasoline engines were installed in a power house nearer the well by thirty feet.

About one month after the starting of the engines, a very decided taste and smell of gasoline developed in the water of the well and has continued, although with diminished intensity, to the present day, nearly three years after its first being observed.

The contour map indicates the relative positions of the well and the gasoline tank, and shows the general slope of the surface towards the well. The dip of the sand-rock is practically in the same direction.

A suit for damages having been inaugurated, I was requested to examine the property and to advise as to the probability of the well being able to recover its original purity within a reasonable length of time.

The information furnished me showed that whether from the exhaust of the engines, from a faulty connection or from a leak in the tank itself, several hundred gallons of gasoline

Read before American Waterworks Association.

had run on to or into the soil within about 100 feet of the well. My opinion was that the injury done was beyond repair and that the well should be abandoned for drinking purposes. When one bears in mind the minute quantity of kerosene which remains upon the hands after handling a lamp and with what certainty a pitcher of ice-water is caused to taste of the oil if the ice be touched by the hands so soiled, it is easy to appreciate how very far several hundred gallons of gasoline would go towards contaminating a ground water.

The correctness of the opinion as expressed above has been borne out by the persistence of the gasoline taste in the water until the present time.

Of course the day will come when the last trace of oil shall have been washed away, but who would venture to fix the date for its accomplishment?

Discussion.

Dr. W. P. Mason: There are one or two little side matters that came up which might possibly be interesting to you. The well was contaminated by gasoline leaking from a tank which had been shown capable of standing at least five pounds air pressure. The amount of pressure coming from the gasoline was surely much less than five pounds, because the tank was only three feet in diameter. Let us call it a pound and a half. The opposing side attempted to show that a tank which would stand five pounds air pressure without leaking would leak under a pound and a half liquid pressure. That I doubted, and I ask the attention of the Court to that time-worn experiment, where we pass gas through a porous plate through which water will not pass. As another illustration I asked his Honor's attention to the fact that when beer is to be pumped from the cellar to a spigot by the ordinary beer pump, in a certain number of cases the barrel will not hold the necessary pressure which the bar-tender couples on his air pump. Now, in such a case, the barrel, although it holds the beer will not hold the necessary amount of air pressure to carry the beer to the faucet, up stairs. His Honor was pleased to state that I showed a very considerable amount of familiarity with the illustration.

I think I have covered the only points of interest which are worth mentioning in reference to this small case which I have reported because of its oddity. I invite your attention to this further point, viz.: the hopeless character of the contamination. If you get ground water contaminated with a mineral product such as petroleum oil, you cannot hope for speedy relief, and you would do better to abandon the source of supply for a new one.

Mr. Maury: In the State of Illinois there once flourished a health officer who was afterward mayor of the town in which he lived. He wanted to get a waterworks plant and a sewer system put in. His shrewd common sense and other virtues have resulted in his promotion to the responsible charge of one of the largest charitable institutions in the State. Just after the close of his term as mayor in describing his troubles in installing water supply and sewers, he said that the citizens objected to the improvements because they were perfectly satisfied with their cisterns and believed that they would not leak. He was equally convinced that the cess pools did leak into and contaminate the cisterns. He thought it was useless to try and convince the objectors by words, and so, one night he sent a man around and had him dump a gallon of kerosene in every cess pool and the next morning everybody was tasting kerosene in the cistern water.

One of the most prominent exhibits at the annual meeting of the Michigan Electrical Association held in Grand Rapids, August 18th to 21st, was that of the Nernst Lamp Company of Pittsburg. The exhibit included a full line of the new Westinghouse-Nernst units, multiple and single glower, for alternating and direct current. The many new features of these lamps, especially the screw burners and the wafer beaters, made the exhibit one of unusual interest to the lighting man present. The exhibit was beautifully illuminated by Westinghouse-Nernst 110 watt units. The company was represented at the Convention by Mr. H. A. Browne, manager of the Detroit Office, and Mr. J. O. Little, manager of the Publicity Department.

AS SEEN BY OTHERS

AS SEEN BY OTHERS.

Contracts for Building Construction.

Woodcraft.—Some manufacturers hold the opinion that when a new building is to be constructed the best plan is to let it to the lowest bidder, hoping by rigid specifications to obtain a passable structure at a low price. This may result disastrously; sometimes for the concern, and at other times for the contractor. The number of ways in which a contractor can skimp work without getting caught is a thing to amaze and confound; and this is particularly true where concrete is involved in the construction. A better plan, and one adopted by some of the most progressive firms, is the system of employing competent inspectors, and then letting the work to a reputable contractor on a percentage basis. . . . For reinforced concrete work the percentage varies somewhat, but 12 per cent. is probably the most common rate. In cases, however, where forms of an irregular shape have to be used, the contractor is put to a good deal more trouble, and the work deserves and receives a higher percentage, this frequently amounting to 15 per cent.

* * * *

Georgian Bay Canal.

Montreal Gazette.—The preliminary estimate of the engineers is that to make a twenty-foot waterway from the Georgian Bay to Montreal by way of the French and Ottawa Rivers would cost from ninety-four to a hundred million dollars. This doubtless means that when it is undertaken it will be well to count on spending a hundred and twenty millions at least upon the work with a possibility of having to spend more. With the country loaded with responsibility for building Sir Wilfrid Laurier's frenzied railway through the sub-Arctic wilds from Winnipeg to Quebec, there is no prospect that for ten years the actually promising scheme can be touched.

* * * *

Mining Engineers in Politics.

The Canadian Mining Journal.—Canadian parliamentarians are drawn largely from the ranks of practising lawyers prominent merchants, doctors, journalists, a sprinkling of farmers and labor representatives, and a miscellaneous residue, including an occasional preacher. The profession of mining engineering has no direct representative. The mining engineer, from the extent of his field and the nature of his work, acquires a knowledge of his country that can hardly be equalled. He would bring to his legislative duties all the qualities of good citizenship with the added special equipment necessary to the practice of an exacting profession.

* * * *

Contract to the Highest Tender.

Prince Albert Times.—The Provincial Government has let the contract for the Provincial Parliament to Peter Lyall & Sons, of Montreal. The amazing feature of the letting of the contract is that the contract was not awarded to the lowest tender. The Western contractors were some \$120,000 lower than the Montreal firm. Yet the Western men were turned down. The Western contractors are not noted for figuring very close. They generally look for a good profit and get it. Why the Provincial Government should have turned down the Regina and Winnipeg contractors in favor of a Montreal firm is somewhat of a mystery, especially when over a hundred thousand dollars could have been saved.

* * * *

The Waste of Water.

Hamilton Spectator.—The same evil that confronts Hamilton in the daily waste of water is the subject of remark in regard to New York's and Brooklyn's supply. The prevalence of this leakage necessitates the addition in the latter

place, of an increased supply of 250,000,000 gallons daily, which is now being provided for. This, it is claimed would be unnecessary for many years to come, if honest consumption prevailed. After all's said and done, it's up to the people to foot the bill.

* * * *

Technical Degrees.

This is an age of specialization; also it is an age in which the desire for titles appears to be increasing. The University of Arkansas seems to have gone to the limit in creating a new course of instruction for the completion of which the degree of "Bachelor of Science in Cement Engineering" is to be conferred. However, it is to be congratulated upon its moderation in refraining to call its new degree "cement engineer."

* * * *

A Long Time to Wait.

The Prince Rupert Empire.—Twenty-five years ago the Canadian Pacific was bossed by Americans, who gave employment to American engineers and contractors in preference to Canadians. William Van Horne and Thomas Shaughnessy are American-born, but to-day they are titled Canadians, who give employment on the Canadian Pacific to men who grew up in Canada—for twenty-five years is a long time to follow one occupation or trade. The Grand Trunk Pacific is bossed by Americans, who give employment to American engineers and contractors in preference to Canadians. Twenty-five years hence Charles M. Hays and Frank W. Morse, American-born, will be titled Canadians, who will give employment on the Grand Trunk Pacific to men who grew up in Canada. Everything comes to those who can wait.

ENGINEERING SOCIETIES.

CANADIAN RAILWAY CLUB.—President, L. R. Johnson; Secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

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

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

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

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

TORONTO BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—96 King Street West, Toronto. Chairman, C. H. Mitchell; Secretary, T. C. Irving, Jr., Traders Bank Building.

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

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

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

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

NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.—President, J. H. Winfield; Secretary, S. Fenn, Bedford Row, Halifax, N.S.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS (TORONTO BRANCH).—W. G. Chace, Secretary, Confederation Life Building, Toronto.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—29 West 39th Street, New York. President, H. L. Holman; Secretary, Calvin W. Rice.

SOCIETY NOTES.

International Association Testing Materials.

The Fifth Congress of the International Association for Testing Materials will be held in Copenhagen early in September, 1909. Arrangements for this congress are already actively in progress. The proceedings of the Congress will consist largely in official reports of standing committees and individual references on scientific subjects relating to the testing of materials. By action of the council, non-official papers by members of the Association to be presented at the Congress will be restricted to the following subjects, as being, in the judgment of the council, of chief importance: Metals,—(a) Metallography; (b) hardness testing; (c) impact tests; (d) testing metals by alternating stresses, thermal treatment, etc.; (e) testing of cast iron; (f) influence of increased temperature on the quality of metal. Hydraulic cements: (g) Reinforced concrete; (h) progress in the methods of testing; (i) cement in sea water; (j) constancy of volume; (k) tests by means of prisms and standard sand; (l) weathering resistance of building stones. Miscellaneous: (m) Oils; (n) caoutchouc; (o) wood; (p) paints on metallic structures. The work of this Congress will be extremely interesting and valuable, and those engineers specially interested should place themselves in communication with the general secretary of the International Association, 11, Nordbahnstrasse 50, Vienna, Austria.

THE MERTHYR SEWAGE FARMS.*

By T. Fletcher Harvey, M. Inst. C.E.,
Borough Engineer of Merthyr Tydfil.

Merthyr has the distinction of having at a comparatively early period grappled with the problems of water supply and sewage disposal, for half a century has passed since the waterworks were commenced, preparatory to the sewerage of the district.

It was in 1858, after several projected schemes, that the Merthyr Local Board obtained an Act of Parliament for the construction of waterworks, and by 1862 the supply had been given to Merthyr from the river Taff Fechan at an intake 6 miles north of the town. In 1863 the impounding reservoir, with a capacity of 350,000,000 gallons, was completed. The cost was only \$410,000, including 41 miles of water pipes from 14-in. to 2-in. diameter. It prepared the way for the sewage disposal works.

The system of sewerage adopted was the combined drainage system, and the network of sewers chiefly consists of earthenware pipe sewers. Very shortly after the temporary outlets had been made into the already polluted river Taff complaints arose, which resulted in an injunction by the Court of Chancery to restrain the Merthyr Local Board from continuing to pour their sewage into the river, and from connecting house drains with the sewers, until some satisfactory process for the purification of the sewage had been devised and put in operation. The sewerage works were therefore suspended. Quoting from the late Mr. Samuel Harpur, engineer and surveyor to the local board: "The question of the purification of the sewage was thus forced upon the attention of the board. They found it necessary to adopt some means by which the sewage of a population of 50,000 persons should be cleansed daily, and hourly, as it issued from the sewers. Various schemes were under consideration, but none of them seemed to meet the requirements of the case, until in April, 1869, a comprehensive scheme for the disposal of the sewage by using it in the irrigation of land was prepared by their

surveyor and was at once received with general approval." The scheme consisted in acquiring and laying out for irrigation about 90 acres of land within the district at Troedyrhiw, and 300 acres of lands without the district, 10 miles south of Merthyr, and in May, 1869, it was ordered that the surveys be proceeded with and the necessary legal steps be taken. In April, 1870, an inquiry into the merits of the scheme was held at Merthyr, on behalf of the Home Secretary, who, in the following month, issued a Provisional Order for the purchase of the necessary lands, which was, after strenuous opposition in both Houses, confirmed by Parliament.

Meanwhile the Court of Chancery suggested that some means should be adopted for mitigating the nuisance, by straining the sewage before discharging it into the river, but the owners of the land at the most suitable site refused to sell, and the local authority were driven to the expedient of constructing two elongated straining tanks under the parish road. After the construction of these tanks the Court of Chancery directed Mr. Bailey Denton to proceed to Merthyr. As the result of his visit and examination he designed and recommended the formation of natural sewage filtering areas.

In those days there were few precedents for sewage farming on a large scale as proposed by the Merthyr sanitary authority, and it is not surprising that much time passed before the final decision was arrived at. Moreover, opinions expressed by the Rivers Pollution Commissioners were not altogether favorable to the general adoption of the system.

Troedyrhiw Sewage Farm.

An address at the annual meeting of the South Wales branch of the British Medical Association, held in Merthyr in July, 1872, "On the Downward Intermittent Filtration of Sewage as it is now in Practical Operation at Troedyrhiw," by Dr. Dyke, gives a clear account of the work done and the results obtained. The author thinks the following quotations from it worth recording: "We were placed under the professional care of Mr. Bailey Denton, who, after due consideration, recommended that the new remedy suggested by Dr. Edward Frankland should be tried at Merthyr." The first volume of the report of the Rivers Pollution Commission published in July, 1870, gives an account of the extensive and interesting series of experiments made by Dr. Edward Frankland, one of the commissioners. "The conclusions arrived at may be thus summarized: Sewage traversing a porous and finely divided soil undergoes a process to some extent analogous to that experienced by blood in passing through the lungs in the act of breathing. A field of porous soil irrigated intermittently virtually performs an act of respiration, copying on an enormous scale the lung-action of a breathing animal, for it is alternately receiving an expiring air, and thus dealing as an oxidising agent with the filthy fluid which is passing through it. The action of the earth as a means of filtration must not be considered as merely mechanical; it is chemical, for the results of filtration properly conducted are the oxidation, and thereby the transformation, of the offensive organic substances, in solution in the sewage, into fertilizing matters, which remain in the soil, and into certain harmless inorganic salts, which pass off in the effluent water."

Straining Tanks.—The pair of straining tanks just referred to were each 200 ft. by 5 ft. by 5 ft. deep, with a centre longitudinal drain, and divided into three bays by open brickwork. The space between the walls was filled with broken furnace slag. The sewage sludge left on the surface of the straining slag was removed and taken to the land, each tank working four or five days. These old tanks were abandoned in 1896 because of the nuisance of clearing the sludge in close proximity to the highway. The sewer was diverted, and a pair of new tanks designed by the author were built on the farm. The sludge is removed by means of light steel tipping wagons, running on a 2-ft. gauge railway, slightly falling in the direction of the load.

Filtration Areas.—About 20 acres of the farm were laid out by Mr. Bailey Denton into four separate filtering areas, and underdrained to a depth of from 5 ft. to 7 ft. The land is a loamy soil 18 in. thick overlying a bed of gravel. Lateral drains about 60 yards apart run towards the main or effluent

* Paper read before the Convention of Engineers and Surveyors.

drain, which is 6 ft. deep. The beds were made to slope towards the main drain by a fall of 1 in 150.

The cost of laying out the 20 acres of filtration area was considerable, and including engineering expenses and charges exceeded \$20,000.

Surface Irrigation.—Adjoining the filtration areas the remaining 50 acres were laid out for surface irrigation by Mr. Samuel Harpur at comparatively little cost, and the results have been satisfactory. Owing to the subsidence of the ground by reason of colliery workings the drainage of the farm of late years has been attended with great difficulties, and a considerable sum of money has been expended and is being spent in continuing the effluent conduit to a point nearly half-a-mile below the boundary of the farm.

The Lower Sewage Farms Near Abercynon.

Before dealing with these farms, situated outside the county borough of Merthyr, it will be appropriate to refer to the agreement made in January, 1878, between the Merthyr Local Board and the Aberdare Local Board, the effect of which is, that the sewage of the Aberdare district is taken over and disposed of on the farm lands, and the control and management of all the sewage farms is in the hands of a joint committee, consisting of seven members, four appointed by Merthyr and three by Aberdare. Since the formation of the "Joint Farms Management Committee" an agreement has been entered into to take over and dispose of the sewage of the Mountain Ash Council's district (excepting Abercynon), and the sewage of Trelewis in the Gelligaer district is also disposed of in the same way.

The main sewer for discharging the sewage of the county borough of Merthyr on to the "lower farms" is about 6½ miles in length from the Troedyrhiw straining tanks to the Merthyr straining tanks at Parknewydd farm, and consists mainly of a 24-in. brick barrel culvert with wrought-iron tubes where valley depressions occur. The serious subsidences caused by underground coal mining have greatly affected the sewer as originally laid. The area of the lands originally acquired has been lessened by the giving up of several acres for colliery works, railways and sidings. The actual area of the portions of the various farms under sewage treatment is as follows: Upper Common, 32 acres; Ynyscadudwg, 83 acres; Parknewydd, 42 acres; Berwerdy, 55 acres; Glyncoch, 13 acres.

Before the sinking of the new colliery pits the Merthyr sewage was distributed on the lands east of the river and was only strained at Troedyrhiw. The author carried out a diversion of the original sewer, syphoned it across the river, and constructed a pair of straining tanks on the west side, near the Aberdare tanks. The Merthyr tanks are each 158 ft. by 9 ft. by 6½ ft. deep, divided into two settling and four straining compartments; the sludge is run out on to land at a lower level, by the opening of hinged covers over pipes laid from the bottom of each compartment at a steep gradient. Owing to the difficulty and expense of transport the sludge is a drug upon the market, nevertheless, many tons have been sold from time to time. The straining material in the tanks is the gravel of the district.

The whole of the land of the lower farms consists of porous alluvial soil about 16 in. thick overlying a thick bed of gravel, a section of which is visible near the effluent. The existence of the gravel subsoil has obviated the necessity of draining the land except to a very slight extent.

The farms are all treated by surface irrigation. The population draining on to them may be estimated at 105,000.

With respect to the analyses of the sewage and sewage effluents, the periodical reports of the county medical officer contain tables which invariably show that a satisfactory result is obtained, the average percentage of purification calculated on the oxygen absorbed being about 81 at Troedyrhiw and 86 at the lower farms, and on albuminoid ammonia 80 and 90 per cent. respectively.

It may be fairly claimed that the working of the Merthyr sewage farm, both at Troedyrhiw and Abercynon has been successful, and while the stipulation that "profit is to be subservient to the proper disposal of sewage" has been strictly adhered to, the pecuniary result has been satisfactory. Tak-

ing an average over the last ten years, the yearly general expenditure on all the farms has been \$9,705.00, and the yearly revenue \$13,720.00, showing a profit over and above the working expenses of \$4,015.00 per annum. The profit is applied by dividing it between the Merthyr and Aberdare Councils in the proportion of the populations of the respective districts, or by carrying out works chargeable to capital account. Judging by the results of operations extending over many years, there appears to be good reason for adopting the system of using sewage as a land fertilizer, wherever suitable land can be obtained, and such land is not infrequent in river valleys. If possible, take sewage to the hungry land, not to the sea.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

(Continued from Page 596.)

5167—August 11—Granting leave to the C.P.R. to construct, maintain, and operate a branch line of railway, or spur, to and into the premises of Thos. Abriel, Nakusp, B.C., in the west division of Kootenay district, Province of British Columbia.

5168—August 13—Approving of C.P.R. Company's Standard Freight Tariff, applying between stations on the Ontario division of its new line of railway between Toronto and Sudbury, Ont.

5169—August 13—Granting leave to the C.P.R. to operate its trains over the interlocking plant at a point where its railway crosses the railway of the G.T.R. near Asylum, London, Ont.

5171—August 14—Authorizing the Central Telephone Association to erect, place, and maintain its wires across the tracks of the G.T.R. at four different points in the Province of Ontario.

5172—August 14—Granting leave to the G.N.W. Telegraph Co. to erect, place, and maintain its wires across the track of the C.P.R. at the camp grounds at Petewawa, Ont.

5173—August 14—Granting leave to the Land Farmers Mutual Telephone Company to erect, place, and maintain its wires across the track of the C.P.R. at Land, Province of Saskatchewan.

5174—August 14—Authorizing corrected plans of the Kettle River Valley, showing location of railway from Grand Forks northerly to Gloucester, Divisions 1 and 2, Province of British Columbia.

5175—August 13—Amending Order No. 5133, dated the 31st of July, A.D. 1908, said Order authorizes the Brockville Water Commissioners to lay and maintain a six-inch water main under the tracks of the G.T.R. where it crosses Bartholomew Street, Brockville, Ontario.

5176—August 14—Authorizing corrected plans of the Kettle River Valley Railway, showing located line of the North Fork Extension in Divisions 1 and 2, Province of British Columbia.

5177—August 5—Approving proposed re-arrangement of the signalling equipment and gates of the C.N.R. at crossing where its line of railway crosses Queen Street in the City of Toronto, Ontario.

5178—August 14—Authorizing the C.P.R. to construct, maintain, and operate branch line or spur to and into the premises of the Great West Coal Company at Roche Percee, Sask.

5179—July 29—Granting leave to the Municipal Council of Wollaston, to construct and maintain diverted highway across the track of the Central Ontario Railway in Lot 11, Concession 8, of the Township of Wollaston, Ont.

5180—August 18—Authorizing the Bell Telephone Company to erect, place, and maintain its aerial wires across the tracks of the G.T.R. at public crossing at Queen Street, Ailsa Craig, Ont.

5181 to 5187, inclusive—August 14—Granting leave to the rural municipality of Woodworth to erect, place, and maintain its wires across the tracks of the C.P.R. at seven different points in the Province of Manitoba.

5188 and 5189—August 14—Granting leave to the Land Farmers' Mutual Telephone Company to erect, place, and

maintain its wires across the track of the C.P.R. at two different points in the Province of Saskatchewan.

5190 to 5192, inclusive—August 18—Granting leave to the Bell Telephone Company to erect, place, and maintain its underground wires across the tracks of the G.T.R. at three different points in the Province of Ontario.

5193—August 18—Approving of revised location of the G.T.P. Railway from Prince Rupert easterly, mile 0.00 to mile 10.64, coast district, Province of British Columbia.

UTILIZATION OF RESIDUALS FROM REFUSE DESTRUCTORS.*

By W. J. Steele, A.M. Inst. C.E., Deputy City Engineer, Bristol.

In submitting a few notes to this conference on utilizing the residuals of the process of burning the refuse from a town, the author ventures to digress from the specific subject by shortly examining the methods at present usually followed in refuse disposal. These may be described as:—

- (1) Filling low-lying land with the crude refuse, such land being temporarily designated a tip or shoot.
- (2) Discharging the crude refuse into the sea at a convenient distance from the shore.
- (3) Stacking the crude refuse on waste land more or less remote from a town, and firing it.
- (4) Burning at a refuse destructor.
- (5) Pulverizing the crude refuse by machinery and using the product for manure, or in the manufacture of fuel by an admixture of tar.

(6) Separating the crude refuse by hand or machinery and using the constituents in such trades as can profitably employ them.

No. 1 is perhaps the simplest and cheapest method in those towns not too remote from suitable land. It has very considerably enhanced the value of the land in some instances, and under favorable conditions is not to be entirely ignored. As, however, it undoubtedly causes discomfort and inconvenience to any inhabitants near a "tip," if not a source of danger to their health, it can only be adopted under the exceptional conditions where sufficient land is available within a reasonable distance of the point of collection.

No. 2 is only possible in seaports, and even then is an expensive, and, on economic grounds, wasteful procedure.

No. 3 is similar, and subject to the same advantages and disadvantages as No. 1, except that any organic matter is destroyed more quickly.

No. 4 is undoubtedly the most effectual in fulfilling the condition that all organic matter liable to become a danger to the public health shall be immediately rendered innocuous. In some towns, however, such a large volume of harmless material has to be burnt in order to destroy a comparatively small quantity of organic matter, that it is a question for consideration whether some other method than the installation and working of somewhat costly plant such as "refuse destructors" cannot be adopted.

Nos. 5 and 6 are on their trial, and will be carefully watched by those responsible for that section of local government controlling refuse disposal, as they have many possibilities in districts where a ready market can be found for the products.

In the utilization of residuals from a destructor much must depend upon the power of the particular locality to absorb them, and in selecting a site for the works this fact should have consideration.

Heat.—Heat may be classed as a residual of the destruction of refuse by burning, and, in fact, is occasionally placed in the foreground by some manufacturers of plant as a reason for installing a destructor; but, in the author's opinion, the only justifiable reason is the immediate destruction of matter injurious to the public health, the generation of steam being only one of the means employed in reducing the cost of the process.

The amount of energy created, of course, varies in different towns, and at the several seasons of the year in the same town; but assuming a town in the United Kingdom of 50,000 inhabitants with refuse of an average character, at least 150 indicated horse-power can be obtained during most periods of the year, or sufficient to generate about 800,000 units of electricity per annum. Where this energy is utilized in pumping plant for sewage or water supply, or in assisting electricity generating stations, a considerable credit may be placed against the cost of burning.

In the town with which the author is connected, if the total energy used in cutting timber for wood paving, depot cranes, fodder machinery, concrete slab machinery, mortar mills and general workshops was obtained from the destructor, about 110 horse-power would be required for 2,600 hours per annum; but although only about one-third of the total quantity of refuse is treated at the destructor, sufficient energy to supply 400 horse-power during any part of the above-named period might be obtained if steam raising was all-important. The only use now made of the heat is to drive mortar mills and clinker-crushing plant, but the further utilization is under consideration.

In the discussion on an able paper on "Municipal Refuse Disposal," read by Mr. J. T. Fetherston, Assoc.M.Am. Inst.C.E., before the American Society of Civil Engineers ("Transactions," vol. lx.), it was suggested that ice might be manufactured by installing an absorption ice machine and utilizing the steam from a destructor plant, a 50-ton destructor being estimated to produce 50 tons of ice per day. The market price for ice in England is a short one, and it is very doubtful if this means of using the steam would recoup the extra cost of installing and working the ice plant, although it may be justified in the United States. Another suggestion made during the same discussion was the adoption of electric collecting wagons driven by storage batteries charged at the destructor, so that the saving in cost on the present methods of collecting the refuse by horse haulage might be set against the expenditure in running the destructor. This seems feasible provided a satisfactory wagon can be evolved.

The disposal of the solid residue of the treated material is, after all, the most difficult part of the subject under consideration, and this opens up the larger question of only burning that portion of the refuse likely to contain organic matter—viz., everything, except ashes, metals, bottles and material of a like nature. Organic waste (garbage) is separated from the ashes and rubbish in the large cities of the United States, and is known as the reduction system, but for a new installation in the borough of Richmond, N.Y., a "mixed refuse" destructor was recommended, on the ground that not only was "mixed refuse" destruction more sanitary than the separate disposal of ashes, garbage and rubbish, but it would avoid the annoyance caused to the householder by the system of having two bins, and, further, a collecting wagon containing garbage only was offensive while on the streets.

The general practice in England of burning the whole of the refuse except metals, bottles, etc., is costly, inasmuch as not only has a larger volume of material to be treated than by the separation system, but the percentage of resulting clinker is very much higher on account of ashes forming such a large proportion of the crude refuse; however, it has the great advantage of forming better combustion in the destruction of the garbage.

Glass, Metals, Pottery, Etc.—The average amount of refuse collected from towns in the United Kingdom is about 570 lb. per head per annum, and in this quantity there are about 25 lb. of glass, metals, pottery and material of a like nature. In a town of 50,000 inhabitants such material will amount to about 560 tons per annum. Some method of intercepting most of these materials from the bulk of the refuse before burning is adopted at most destructors, the attention paid to it depending upon the marketable value of the recovered material in the particular locality, and it is conceivable that in some cases a proper mechanical or hand system might profitably be installed, but as the author has had no

* Paper read before the Conference of Engineers and Surveyors.

experience of such a system he is unable to advance any opinion.

Resultant of Burnt Refuse.—The residue of the average refuse burnt may be taken as 33 per cent. of the original weight, and consists of clinker, ashes, flue soot and dust.

The flue soot and dust do not amount to a large proportion, and little difficulty is experienced in disposing of them for agricultural purposes or forming a base for disinfecting powder.

The popular means of disposal of the clinker and ashes is to use them as a substitute for stone, and so far as the author is aware, no other channel has yet been available. Whether they are used in combination with cement, lime asphalt or tar, clinker or ashes can never have the same properties as stone, and they are consequently most valuable in a district remote from a quarry. Where stone quarries are near a town it may be more economical in some sections of that town to use the "spawls" or waste from the quarries than to haul clinker from the destructor; hence in such a town the difficulty of making full use of the residuals is obvious. In Bristol the utilization of these products is carried out as described below, and the following table may be of some interest in showing the amount of material disposed of:—

Population, 1908 (estimated).....	372,785
Length of highways in miles (about)....	342
Refuse collected per annum, in tons.....	95,000
Refuse received at destructor per annum, in tons	32,216
Resultant of burnt refuse, in tons.....	10,313
Resultant of burnt refuse, if whole of collected refuse was burnt, in tons (estimated) ..	30,411
Resultant annually required for municipal purposes, such as road foundations, concrete slabs, pavements, mortar, etc., in tons.....	5,161
Resultant sold to the public, in tons.	3,133
—	
Total utilized, in tons	8,294
Percentage of resultant utilized	80
Percentage of resultant utilized, if whole of collected refuse was burnt.....	27

It will be observed that only 80 per cent. of the resultant of the burnt refuse now produced is utilized; this is due to the fact that there are several quarries within the city boundaries which form formidable competitors to the disposal of the product, but the question of making further use of the material is under consideration and probably the whole of the present output will be utilized. Assuming that Bristol was remote from a stone quarry, and the whole of the collected refuse was burnt, the most of the resultant that could be used would probably not exceed 15,000 tons per annum, or about 50 per cent. of that produced, but the remaining 50 per cent. could be absorbed in filling worked-out quarries, clay-pits and low-lying lands in situations where the tipping of crude refuse is prohibitive.

Concrete slabs for footways are made by three methods—viz., hydraulic pressing plant rocking machine, and hand labour in wooden moulds; window and door heads and sills, steps and other artificial stone dressings are made by hand labour in wooden moulds. The slabs are composed of clinker mixed in the proportion of three parts of clinker to one part of Portland cement; the slabs are faced with granite chippings in the proportion of three parts of chippings to one part of Portland cement:—

One ton of clinker will make 16 superficial yards of concrete flagging.

One ton of granite siftings will face 60 superficial yards of concrete flagging.

One ton of 2-inch flags is equal to an area of 10½ yards superficial.

A series of absorption and breaking tests were recently carried out, but so many conflicting results were obtained that it has been found necessary to considerably extend them

if they are to be any guide; the most reliable test, however, is the daily use of the materials in the purpose for which they are intended. That concrete slab pavements largely composed of destructor clinker are satisfactory has been fully proved in Bristol, about two miles being laid each year. Some of the pavements have been under heavy traffic for more than twelve years, and are still in good condition, which is more than can be said for some Pennant flagging in use for the same period.

Hydraulic Press.—This plant consists of two rams, one forcing the filled mould under the top bed and the other applying the pressure. The mould is then withdrawn from under the top bed, turned over, and the slab is dropped on to a trolley and run out to the drying shed. The pressure on each slab is two tons per square inch. The area of slabs made in one day of nine and a half hours is 97 superficial yards, and the cost of production 65 cents per yard, inclusive of first cost, and depreciation of, and repairs to, the machine.

Rocking Machines.—These are the invention of the works superintendent, Mr. W. H. Baker, and consist of an iron perforated mould, mounted on a cam shaft; by turning the shaft a rocking motion is given, this allows of the surplus water filtering through the perforations, secures a homogeneous mixture and a thorough consolidation of the materials. The area of slabs made by one machine in a day of nine and a half hours is 30 superficial yards, and the cost of production 35 cents per yard.

Hand Labour.—Slabs and building dressings are made in wooden moulds by hand, the cost of production being 55 cents per superficial yard for slabs and 70 cents per cubic foot for dressings. Manufacturing paving setts by mixing the clinker with asphalt is now being tried in an important borough in London, but as this is still in an experimental stage no data is yet to hand as to the success of the process.

Brickmaking has been in operation at West Hartlepool for some time, and from some valuable information given by the borough engineer, Mr. Nelson F. Dennis, Assoc. M. Inst. C.E., the following facts are given:—

Six per cent. of slaked lime is used in the manufacture.

Crushing test per square foot, 218 tons.

Absorption of moisture by weight, 7 per cent.

Cost of making bricks per 1,000, \$4.25.

Total cost of plant and buildings, \$15,000.

They have been used in building manholes on sewers, stable premises, and extensions of the electricity station, but their general use in external work is not recommended.

In contributing these few notes the author has endeavoured to show that, as in most questions affecting municipal work, local conditions are the predominating factor; but probably in every case where town refuse is burnt in a destructor there is ample scope for development in utilizing the residuals beyond what has already been accomplished. It is suggested, however, that this fact alone is not a sufficient deterrent to the installation of a destructor, as the outstanding feature of its use is the effectual destruction of matter which may be injurious to the public health, and as this may be accomplished in most cases at a total annual cost of not more than 4 mills on the dollar it is a justifiable expenditure.

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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.

New Brunswick.

FREDERICTON.—Tender for Slack's Cove Bridge will be received at the Department of Public Works, Fredericton, until Monday, 31st day of August, 1908, at noon, for rebuilding Slack's Cove Bridge on Rock Port Road, parish of Sackville, Westmorland Co., N.B., according to plan and specification to be seen at the Public Works Department, Fredericton, N.B., and at the store of Mr. F. B. Black, Sackville, N.B. John Morrissy, Chief Commissioner, Department of Public Works.

Quebec.

MONTREAL.—Tenders for concrete walls and widening of the Lachine Canal will be received at this office until 16 o'clock on Monday, the 31st August, 1908. Plans and specifications can be seen at the office of the superintending engineer of the Quebec Canals, No. 2 Place d'Armes, Montreal. L. K. Jones, secretary. Department of Railways and Canals.

MONTREAL.—At a meeting of the Water Committee it was decided to call for tenders for the construction of a pumping well and the making of connection from the new concrete conduit to the pumping mains at the wheelhouse at Point St. Charles. It is estimated that the work will cost between twenty and twenty-five thousand dollars.

ST. JOHNS.—Tender for dredging Richelieu River, St. Johns, P.Q., will be received until Friday, September 4th, 1908, at 4 p.m., for dredging required in the Richelieu River at St. Johns, P.Q. Tenders will not be considered unless made on the form supplied, and signed with the actual signatures of tenderers. By order, R. C. Desrochers, Assistant Secretary, Department of Public Works.

Ontario.

BRANTFORD.—Sealed tenders addressed to Samuel Suddaby, Esq., in care of the City Clerk, Brantford, Ont., will be received till 12 o'clock, noon, on Friday, September 4th, 1908, for the construction of a bridge across the canal at the foot of Alfred Street. (a) Concrete abutments and wing walls. (b) Steel bridge, 60 foot span, 18 feet roadway and 6 foot sidewalk. (c) An alternate tender will be received for a reinforced concrete arch bridge in place of (a) and (b). T. Harry Jones, City Engineer.

DURHAM.—Tender for Armoury, Durham, Ont., will be received at this office until 4 p.m. on Friday, September 4, 1908, for the construction of an Armoury at Durham, Ont. R. C. Desrochers, Assistant Secretary, Department of Public Works.

HAMILTON.—The Fire and Water Committee have decided to ask for tenders on synchronous motors of 66 cycles for the Beach pumping stations. All the tenders received were on induction motors except one, on a 25 cycle motor, which could not be used with Cataract power.

L'ORIGNAL.—Tenders addressed to the undersigned will be received up to 12 o'clock noon on Tuesday, the 6th day of October next, A.D. 1908, for the construction of an Iron Highway Bridge over the Big Castor River, 115 feet span. State price for each, and also for removing the old 80-foot span, now in use, to the site of the new bridge over the Little Castor, about one mile distant, and place the same on the new abutments ready for public use. Tenders are also asked for the masonry work required for the Big Castor Bridge, concrete or stone. Information can be obtained from the undersigned by letter or in person or from O. Duford of

Embrun. Tenders will be opened at meeting of Council on Tuesday, the 13th October next. E. Abbott Johnson, County Clerk, L'Orignal, Ont.

NIAGARA FALLS.—Tenders for Niagara, Ont., Rifle Range, and addressed to the Secretary of the Militia Council, Department of Militia and Defence, Ottawa, will be received until noon, the 8th September proximo, for the construction of a Rifle Range at Niagara-on-the-Lake. E. F. Jarvis, Secretary, Department of Militia and Defence, Department of Militia and Defence.

NORTH TORONTO.—Tenders for concrete sidewalk will be received by the undersigned up to 7 p.m., on Wednesday, 2nd of September, for Glencairn Avenue and Merton Street, Town North Toronto. Plans and specifications by P. S. Gibson, Town Engineer, can be seen at the Town Hall, Eglinton. No tender necessarily accepted. W. J. Douglas, Clerk.

PETROLEA.—Tenders for pavement will be received by the undersigned up to 6 p.m., Monday, August 31st, 1908, for about 6,000 square yards of vitrified brick pavement, with cement curb, on Main Street, Petrolea. J. McHattie, town clerk; C. A. Jones, town engineer, Petrolea, Ont.

Manitoba.

VIRDEN.—Tenders for telephone lines will be received up to noon on Monday, the 31st day of August, 1908, for the building of such telephone lines and the installation of such telephones as will be required in the telephone system in the rural municipality of Pipestone. Plans and specifications may be seen at the office of the chief engineer of telephones and telegraphs, Winnipeg. A. P. Power, secretary-treasurer. Virden, Man.

WINNIPEG.—Tenders for lock gates, St. Andrew's Rapids, Man., will be received at this office until 4 p.m. on Monday, September 14, 1908, for the construction of lock gates at St. Andrew's Rapids, Red River, Province of Manitoba. Plans and specifications can be seen at this Department; at the offices of Mr. A. R. Dufresne, resident engineer of the Department at Winnipeg; Mr. J. G. Sing, resident engineer, Confederation Life Building, Toronto. R. C. Desrochers, Assistant Secretary. Department of Public Works.

Saskatchewan.

REGINA.—Sealed tenders will be received up to 4.30 p.m. of Wednesday, September 2nd, 1908, for the construction of two reinforced concrete abutments and earth approaches for a highway traffic bridge over the Qu'Appelle River, on Section 35, Township 20, Range 13, West of the 2nd Meridian, near Lebret, Sask. F. J. Robinson, Deputy Commissioner, Department of Public Works, Regina.

CONTRACTS AWARDED.

Ontario.

CORNWALL.—The contract for repairing the break to the Cornwall Canal has been awarded to Thomas A. Nicholson, St. Catharines, Ont.

HAILEYBURY.—The tenders for the job of building the pump-house were opened and read as follows: R. J. Handcock, \$4,231; P. Laird, above foundations, \$1,995; J. Brett, foundations, \$265; J. H. McNight, above foundations, \$1,990; H. Gregg, brickwork, \$780; Jones & Dempster, \$2,465. As the figures were in such shape that it was

impossible to decide without further information from the engineers, the decision of the Board was reserved till a later date.

KINGSTON.—W. D. Lacey, Kingston, is awarded the contract for the new rifle range at Barriefield.

KINCARDINE.—The township council has awarded the contract of building a reinforced concrete bridge flat arch, 25-foot span, over the river on the 7th concession of the township of Kincardine, to C. S. Wood, of Bruce, Tiverton. The township council of Bruce has awarded the contract of building two reinforced concrete flat arch bridges, one on the 4th concession of Bruce and one on the 6th concession of Bruce, near Underwood, also to Mr. Wood.

OTTAWA.—The National Transcontinental Railway Commissioners opened tenders for all of the 1,800 miles of line through the wilderness from Moncton to Winnipeg which had not been previously let. These were in the Provinces of Quebec and Ontario, there being 222 miles in Quebec and 354 miles in Ontario to the north of Lake Huron and Lake Superior. The tenders opened to-day covered this remaining 576 miles. While the tenders have not yet been figured out, and it is not known which is the lowest, and, therefore, successful, sufficient calculation has been done to show that the rates are reasonable on all the six lengths of route which were offered to contractors. There were seventeen tenders received from the following contractors: J. W. Stewart, Ryan & McDougall, the Nipegon Construction Co., Craig & Thompson, M. P. & J. T. Davis, MacDonald & O'Brien, and the Grand Trunk Pacific Railway Co. The contracts will all provide that the work must be completed by the last day of 1910.

ST. CATHARINES.—The contract has been awarded for the new Whitman & Barnes factory on the old site. The tender of the Builders' Supply Co., of this city, has been accepted, and building operations will begin at once. The contractor is under obligation to have the buildings erected by October 10th. They are to be of stone, and of the same dimensions as the factory burned a few months ago.

TORONTO.—The Concrete Engineering and Construction Co., Limited, Toronto, have secured the contract for all the fireproofing work in connection with the Household Science Building, University of Toronto.

Alberta.

EDMONTON.—The Canadian General Electric Co., of Peterboro', has been awarded the contract for the motor supplies for the street railway here, and the cars will be built by the Ottawa Car Works. These were the last contracts to be awarded in connection with the street railway.

LETHBRIDGE.—The city council has awarded the contract for a 450,000 gallon stand pipe to the Minneapolis Steel and Machinery Co. for \$14,965. The pipe will be completed early in December.

British Columbia.

VICTORIA.—The city council awarded the contract for 23,000 feet of wire and 350 insulators and pins for line to high-level tank on St. Charles Street to the Hinton Electric Co. at 17¾ cents per pound for the wire, \$6 per hundred for the insulators and \$2.15 for the pins. Tenders were received for the erection of a retaining wall along the east side of Ross Bay Cemetery as follows: A. O. Roy, \$1.50 per lineal foot; West & McDonald, \$2.50 for the first 500 feet, but if the work proves easier than expected they will give the city the benefit of it; McDougall & Jenkins, \$1.20 per lineal foot.

Foreign.

NEW YORK.—Nearly \$16,000,000, it is estimated, is involved in two contracts that have just been signed here, one providing Havana, the capital of Cuba, with a proper sewer system, and the other for the extensive paving of the city. The contracts just signed were between the McGivney & Rockelsy Construction Co. and the Cuban Engineering and Contracting Co., and the Uvalde Asphalt Paving Co., of this city.

RAILWAYS—STEAM AND ELECTRIC.

Quebec.

QUEBEC.—A delegation composed of Messrs. Nap. Rousseau, Vigneault and others, accompanied by M. Tourigny, M.P.P. for Arthabaska, and M. Ouellette, M.P.P. for Yamaska, waited on Sir Lomer Gouin yesterday morning and asked that a subsidy be granted a proposed railway to traverse the county of Arthabaska. The new railway, which will be known by the name of the Eastern Townships Railway, has received a Federal charter. The road will start from a point near the I.C.R. at St. Leonard Junction and run through the villages of St. Clotilde, St. Albert de Victoriaville, Arthabaskaville, St. Paul de Chester, Fecteau Mills, St. Audrieu to Dudswell Junction, on the Quebec Central.

RIVIERE-DU-LOUP.—Tender for stores and office building, Riviere-du-Loup, will be received up to and including Tuesday, September 1st, 1908, for the construction of a brick building with concrete foundation at Riviere-du-Loup, Que. D. Pottinger, General Manager. Railway office, Moncton, N.B.

Ontario.

OTTAWA.—The Grand Trunk Pacific has taken steps to cancel the contract with the Reynolds Construction Company for the building of 150 miles of the Abitibi section of the National Transcontinental. The contract for construction was awarded to the Grand Trunk Pacific, which sub-let to the Reynolds Co., an American concern. They have done a good deal of preliminary work, but have failed to make adequate progress with the roadway. The National Transcontinental Commission recently served notice on the Grand Trunk Pacific that there would have to be thirty-five hundred men put on the work in September or the contract would be taken off their hands and the Commission would do the work itself, while the \$200,000 guarantee of the Grand Trunk Pacific would be confiscated.

SUDBURY.—Survey parties are now out in the field making surveys to connect the eastern and western systems of the Canadian Northern. There is a five hundred and fifty mile gap between Sudbury and Port Arthur to be built.

Saskatchewan.

FRANCIS.—Track-laying on the Stoughton-Weyburn branch has commenced.

REGINA.—The C.N.R. authorities announce that the Regina and Brandon line will be opened within three weeks. This will give Saskatchewan a short competing line to the lake front, which has been long hoped for.

WYNYARD.—Grading operations at this town are now completed and Contractor J. G. Hargrave's outfit has moved twelve miles west. Building operations have now commenced on the station and freight shed at Elfros, east of Wynyard. Division Engineer J. Callaghan, of the C.P.R., was here last week, and it is understood that steel-laying operations from Leslie west to Wynyard will be started within the next week or two.

Alberta.

EDMONTON.—A gang of thirty men under Superintendent Young, of the Walkerville Bridge Co., commenced work on the G.T.P. bridge at Clover Bar this morning. It is expected the superstructure of the bridge will be in place in three months.

LIGHT, HEAT, AND POWER.

Quebec.

MONTREAL.—The Montreal Light and Power Co. have offered to renew the contract for city lighting on the following terms: Arc lamps, \$75 per annum. For incandescent street lamps of 32 c.p., at the rate of \$24 per annum; for incandescent street lamps of 64 c.p., at the rate of \$36 per annum.

Ontario.

PORT ARTHUR.—The plans of Mr. Cecil B. Smith for the new service dam at the power-house were amended by the Power Commissioners to-day, when it was decided

to build an \$80,000 structure, instead of the \$40,000 dam recommended by Mr. Smith.

ST. CATHARINES.—The time for submitting tenders for lighting the city streets expired on Saturday, no tenders having been accepted. Mr. Hawkins, of the Cataract Power Co., to-day had a conference with the mayor and the Fire and Light Committee. It is expected the outcome will be a deal with the Cataract Power Co.

Manitoba.

WINNIPEG.—The Great Falls Power Co. are endeavoring to interest the Manitoba Government in a proposition to purchase from thirty to a hundred thousand horse-power of electrical energy to be distributed throughout the Province over the trunk lines of the Government telephone system. The price would be fixed at \$12 per horse-power, under a forty year contract.

SEWERAGE AND WATERWORKS.

Ontario.

GUELPH.—The two hundred and sixty feet of iron pipe, fourteen inches in diameter, which is to supply the city with water during the construction of the new reservoir at the pumping station, was successfully lowered into place yesterday. The work was done by Contractor Conery with the aid of thirty men and twenty-six endless chain pulleys.

Manitoba.

On August 18th a by-law to raise \$25,000 concerning the waterworks was voted on and was defeated.

British Columbia.

VICTORIA.—It is expected tenders will be called for at once for two pumps for the high pressure salt system of fire protection. The pumps, which will be duplicates, one for operation by steam and the other by electricity, will have a capacity of 4,000,000 gallons each per 24 hours, or 2,600 gallons per minute. They will be located in close proximity to the city electric lighting station, steam from which will be used to operate one of them in case electrical current should not be available, through the wires being down or for any other reason. The pumps will be similar to the one recently installed by the B.C. Electric Company for its private salt water system, but each will be several times larger than it.

Quebec.

HULL.—City Engineer Farley of Hull states that the work on the sewerage system is being pushed ahead as rapidly as possible. The large pipes for the mains arrived from Glasgow, Scotland and are being distributed along the line of operations. While the work will scarcely be completed within the time limit, September 5th, still the delay will not interfere with the progress of the company in paving the streets, as it will be far enough advanced to allow them to go on with the same.

Foreign.

PITTSBURG, PA.—Experiments being made at the new \$10,000 plant at the Homeopathic Hospital here are expected to result in a simple and practical method of purifying water. The plant is for the manufacture of ozone, which it is believed will destroy all organic matter in water and kill all kinds of bacteria. Tests are being made with water from the city pipes and from sewers and with disease germs.

TELEPHONY.

Ontario.

MIDDLEPORT.—The telephone system in the village is nearly completed. A large number of residents have availed themselves of the opportunity of getting phones in, and they are giving good satisfaction. Much credit is due to the energy of Mr. Jas. Douglas to have them placed here.

CHATHAM.—The Bell franchise expires this year, and the Blenheim and South Harwick Co. is ready to enter the

city and give very much lower rates. They offer to furnish a service at \$8 to \$16 a year, a cut of \$10, which would effect a saving of \$600 a year to present subscribers. The new company also offers to lay its wires underground. The Bell pays \$400 a year to the municipality under the expiring franchise.

NORTH AUGUSTA.—Construction work on the rural telephone line has resumed.

RECENT FIRES.

Ontario.

LONDON.—Fire on August 18th and 19th destroyed the following property. The estimated loss is given as: Westman Hardware Co., \$45,000; Darch & Hunter, \$20,000; Cowan Hardware Co., \$3,000; Morrison Shoe Co., \$12,000; John Friend, confectioner, \$250; V. Cronyn, owner of destroyed building, \$20,000; Canada Packing Co., \$600. Estimated total, \$90,850.

TORONTO.—Fire caused a loss of about \$125,000 to the five-storey building and stock of the Rice Lewis & Son, Limited, hardware and iron merchants, King and Victoria Streets. They are now, however, in a position to carry on business as usual at the same place.

Manitoba.

MINNEDOSA.—The worst fire in the history of Minnedosa occurred to-day, when the C.P.R. engine house was destroyed and four locomotives damaged. One engine was dragged out on to the turntable and thus escaped, but three others, which they were unable to get out, suffered great damage. At one time it looked as if the freight offices, elevators and a large amount of rolling stock would go, but they were saved. It is difficult to make an estimate of the damage, but probably \$20,000 would be a close estimate.

MISCELLANEOUS.

New Brunswick.

ST. JOHN.—The Public Works Department, Ottawa, is sending out two survey parties to survey the shoals and rapids on 60 miles of the St. John River, between Woodstock and Fredericton. This is preliminary to their removal, so as to make the river navigable to Woodstock.

Quebec.

Quebec.—The big Carrier Laine & Company factory at Levis, which has been closed for the last few years in consequence of business troubles and litigation, was sold to-day at Levis to the Bank of Montreal, for \$380,000. A significant fact at the sale to-day was the presence of Hon. Mr. Pugsley, which lends importance to the rumor that the property will shortly pass into possession of the Dominion Government for machine repair works for the Marine Department. It has a frontage of over 700 feet on the St. Lawrence, and the Intercolonial Railway passes through it.

ST. JOHNS.—Tenders are being called for dredging work to improve the navigation of the Richelieu River between St. Johns and Lake Champlain. The construction of a stoppage dam 1,350 feet in length will be the next step. The dredging is estimated to cost \$90,000, and the whole work about \$200,000. The object of the dam is to lower the crest of the rapids at St. Johns by almost five feet. This will raise the water in Chambly Canal a foot, and will prevent the annual spring flooding of about thirty thousand acres of land along the Richelieu. There will be a channel dredged 49 feet by 75 feet. The water levels will be regulated all the way from St. Johns to Rouse's Point.

Ontario.

SAULT STE. MARIE.—Indications of returning prosperity in this town were shown in the announcement that the Canadian Pacific has placed an order with the Lake Superior Corporation for 85,000 tons of 85-pound rails for delivery soon. The company has also been assured it will get big contracts from the Grand Trunk Pacific the first of the month, when the plant will probably resume operations. Fifteen hundred men will go back to work.

Manitoba.

DELORAINÉ.—The Dominion Forestry Department has been very successful in preserving and cultivating forests along the Turtle Mountains, and a splendid reserve now exists where a few years ago all was blackened and burnt waste.

WINNIPEG.—At a meeting of the new directors of the Western Iron Works, Limited, David Trainer, formerly of the Carnegie Steel Company and Canadian Copper Company, was elected manager vice H. R. Eade, who has taken the position of secretary-treasurer. The board, together with the new management, are instituting a vigorous and progressive policy, new capital being interested in the company. The directors are: C. A. Baskerville, president; C. P. Banning, vice-president; A. R. D. Patterson, second vice-president; C. M. Simpson, J. L. Doupe, Alex. Simmers, W. A. McLeod and W. H. Corbett.

Alberta.

EDMONTON.—Arrangements are being completed whereby the whole eastern slope of the Rocky Mountains in Canada will be surveyed, with a view to the construction of dams to form a reservoir for holding the water which flows down from the mountain in the spring and causes the rivers of the province to flood. By means of these reservoirs a dual purpose will be served. The water may be held and used throughout the summer for irrigation of land where necessary, and in places where irrigation is not required, it may be allowed to flow away gradually and thus prevent floods, which carry away logs and do other damage in the spring.

British Columbia.

VANCOUVER.—New York capitalists have purchased 16,000 acres of cedar timber limits on the north-east side of Vancouver island for \$300,000. They will establish a logging camp this fall and may erect a saw mill. Another lumber deal to-day was that of Messrs. James & Somerville, of Memphis, Tenn., who have purchased three tracts aggregating 20,000 acres between Jervis Inlet and Grief Point. The deal aggregates about \$400,000.

PERSONAL.

MR. FRANK MOBERLY, of the G.T.P. Railway engineering staff, North Bay, has been transferred to Abitibi, Ont.

MESSRS. SOUPER & CALLAGHAN have opened an office as engineers and agents at 46 Grosvenor Chambers, Manchester, Eng.

MR. A. O. WINTERS, general superintendent of the G.T.P. Railway in the West, has resigned. Mr. Winters was formerly superintendent of the C.P.R. at Brandon and Fort William.

PROF. W. MUIR EDWARDS, B.Sc., civil engineer, who has been connected as lecturer with McGill College for some years, has accepted a similar position in the new Edmonton University.

CHIEF ENGINEER SCHREIBER, of the Department of Railways, left Ottawa on the 25th to make an inspection of Grand Trunk Pacific construction work from Prince Rupert on the coast, fifty miles or more inland.

MR. JOHN ASHWORTH, of Ashworth & Morris, Manchester, Eng., and president of the Manchester Geological and Mining Society, has just visited Toronto in the interests of the British mining men who are to tour Canada during August and September.

MR. W. C. SRANF, of Charleston, W. Va., has been appointed general manager of the Lake Superior Corporation. He is expected to arrive shortly to take charge of the allied industries of the company. Mr. Sranf was formerly general manager of the Kanawha and West Virginia Railway.

MR. W. C. MCGHIE, 58 Bismarck Avenue, Toronto, has been appointed chairman of the Board of Examiners of Stationary Engineers by the Ontario Government. The position is a new one, created by the Act of last session. The duty of the Board will be to examine the certificates of stationary engineers, and see that they are up to the

proper standard. He will enter upon his duties September 1st.

PROF. E. A. STONE, late of Dalhousie University, has been appointed Dean of the Engineering School, of the University of New Brunswick. He is a native of Charlottetown, P.E.I., and was educated in Montreal and graduated from McGill University in 1891 as gold medalist in civil engineering with the degree of B.A.Sc. In 1894 he obtained the degree of Master of Engineering. He has had extensive experience in railroad engineering, having been engaged in designing several street railway track works in Montreal and Toronto. He was later on the staff of the chief engineer of the Canada Foundry Co., of Toronto, and for the past year was professor of civil engineering at Dalhousie College, Halifax.

OBITUARY.

Mr. John Fensom, founder of the Fensom Elevator Works, passed away, August 23rd, at his home, 540 Sherbourne Street, after an illness of about three weeks. Mr. Fensom came to America from England, settling in Massachusetts, where he learned his trade. Coming to Canada later he made his home in Toronto some fifty years ago, starting in business as a manufacturer of machinery. About thirty-five years ago he devoted special attention to the construction of elevators, organizing the Fensom Elevator Co. This company was amalgamated with the Otis Elevator Co. three years ago, and Mr. Fensom retired from active business.

NEW C.P.R. LOCOMOTIVES.

As reported early in August the Canadian Pacific placed an order with their Angus Shops for 10 ten-wheel 4-6-0 type locomotives. The general dimensions and equipment are as follows:

Weight, total	190,000 pounds
Weight on drivers	141,000 pounds
Cylinders	22½ x 28 inches
Diameter of drivers63 inches
Boilers, type	Wagon top
“ working steam pressure	180 pounds
“ heating surface	2,418 square feet
Tubes, number	264
“ outside diameter	(240) 2-inch; (24) 5 inch
“ length	14 feet 3 inches
Firebox, material	Otis steel
“ length	8 feet 6½ inches
“ width	5 feet 7/8-inch
Grate area	40 square feet
Water capacity	5,000 Imperial gallons
Coal capacity	10 tons
Air brakes	Westinghouse
Axles	Mild steel
Bell	Little Giant
Brake-beams	Simplex truss
Brake-shoes	Canadian Pacific Standard
Couplers	Tower
Headlights	Canadian Pacific standard electric
Injectors	Handcock
Safety valves	World
Lubricators	Detroit, 5-feed
Springs	Canadian Pacific standard
Steam gauges	Star vertical
Steam heating equipment	Gold, Leslie reducing valve
Tires	Krupp
Wheel centers	Cast steel
Superheater	Vaughan-Horsey

GREAT MINERAL SHOW.

The mineral exhibit at the forthcoming Canadian National Exhibition will, beyond doubt, be the best of the kind ever made at any Exhibition in Toronto, Canada, and