

PAGES

MISSING

The Canadian Engineer

WEEKLY

ESTABLISHED 1893

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The Canadian Engineer

ESTABLISHED 1893

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

Editor—E. A. JAMES, B.A. Sc.

Business Manager—JAMES J. SALMOND.

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HEAD OFFICE: 62 Church Street, and Court Street, Toronto
TELEPHONE MAIN 7404.

Montreal Office: B 32 Board of Trade Building. T. C. Allum, Business and Editorial Representative. Phone M 2797.

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TORONTO, CANADA, APRIL 17th, 1908.

A subscriber has for sale bound volumes of the Canadian Engineer for 1893, 1894, and 1895. What are they worth to you?

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SPECIAL NOTICE.

Mr. Oswald Barratt no longer represents The Canadian Engineer at Vancouver. Subscribers and advertisers in British Columbia will please deal, for the time being, direct with the head office at Toronto.

A NATIONAL CEMENT ASSOCIATION.

The cement users of Canada are planning for a national organization. The wonder is that they have so long delayed. Few departments of Canadian trade can show such steady and remarkable growth as the cement industry. From 500,000 barrels valued at three-quarters of a million in 1900, the industry has grown until in 1907 there was used over three million barrels valued at almost six million dollars. Few interests of this magnitude are without an organization to protect their trade, increase their business prospects, and lead in educational movements peculiar to their occupation.

Much fine spun ingenuity has been spent on adapting cement to various forms of construction, and many methods of cheapening construction have developed with usage, but these have not always been in the best interest of either the engineering profession, which is looked upon as responsible for safe design, the public or the cement users. Competition has been keen, unskilled labor, has been employed even to the danger point, and concrete poor in cement has been placed much to detriment of the cement trade. A national cement organization will remove many errors in method of construction and design, and will educate public opinion in the use of this comparatively new construction material.

First impressions are lasting, and the cement users must be careful to make a favorable impression at their first gathering—nothing must be done that may in any way suggest to the public a "cement trust." Public opinion is very sensitive just now on trusts and combines, and any organization that would suggest the regulation of rates and prices would not be received kindly by the public.

The object of the Association should be clearly defined and stated, and so long as its purpose is to promote the best methods to be employed in the manufacture of cement; in the mixing of concrete; and the erection of concrete structures, the Association will have good success.

Outside of the dissemination of information in the technical press perhaps the best method of encouraging the study and use of cement would be by the holding of an exhibition at which methods of working, materials and machinery could be studied, and men from different localities gather to exchange ideas, relate experiences, and gather practical ideas from practical men.

An organization of cement workers will be formed and it will be valuable to each individual cement user just in proportion to the support he gives it.

THE QUEBEC BRIDGE.

It is now some eight months since the Quebec Bridge collapsed, yet we do not hear of any plans being prepared for its completion. For months the Commission were preparing the report, endeavoring, it is said, to fix the blame, but even during that time something might have been done that would have aided in reviving the venture.

The Quebec Bridge will be built. It will be built on the present site—why then this delay?

The financial history of the Quebec Bridge and Railway Company is not pleasant reading. The Government are certainly at fault for allowing an undertaking, national in character and extent to be promoted by a private company. Having learned their lesson and paid dearly for it, the Government will surely approach the task the second time as a public work.

The Commission state that "a bridge of the adopted span that will unquestionably be safe can be built, but in the present state of professional knowledge a considerably larger amount of metal would have to be used than might be required if our knowledge were more exact." They do not, however, pass an opinion on the general design, but their report would lead one to infer that the general design was acceptable and that lower unit stress in the working out of this design would give satisfactory results.

The lack of money caused the failure of the first bridge, the design being modified to suit the estimate, and unless the Government appoint a commission of engineers to design a new bridge; prepare sufficient specifications and superintend construction, failure may easily occur again. A board of eminent Canadian engineers, having in view the safe design of a structure and not a very limited estimate would prepare plans and complete the structure safely and economically, and just as successfully as engineers from other lands.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

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

4552—April 1—Authorizing the corporation of the town of Thorold, Ont., to lay its water pipes through, across, and under the lands and railway of the Niagara, St. Catharines and Toronto Railway Company.

4553—April 2—Authorizing the C.P.R. to construct a spur to the premises of the McLeod Milling Company, Macleod, Alberta.

4554—April 1—Recommending to the Governor-in-Council for approval the by-law of the Canadian Northern Ontario Railway respecting the travelling upon and use of the railway.

4555—April 1—Recommending to the Governor-in-Council for approval the by-law of the Canadian Northern Quebec Railway respecting the travelling upon and use of the railway.

4556—March 28—Directing the G.T.R. to provide and keep at its own expense a watchman at Thames Street, Ingersoll, Ont., daily between the hours of 6 a.m. and 11 p.m.

4557—April 2—Authorizing the township of Rochester to erect its telephone wires across the tracks of the C.P.R. at the Charon Line, about one and one-half miles east of Belle River Station, Ont.

4558—April 2—Authorizing the Crow's Nest Southern Railway Co. to operate its trains over the track of the spur of the C.P.R., about three-quarters of a mile east of Hosmer, B.C.

4559—April 1—Authorizing the C.P.R. to make a special rate of \$50 per capita for mining students of McGill University for a trip from Montreal, P.Q., to Vancouver, B.C., including side trips to Rossland and Greenwood; also, rate of \$40 per capita from Montreal to Rossland, Phoenix and Greenwood, B.C.

4560—April 3—Authorizing Damase Albert of St. Francis de Madawaska, to lay a water pipe under the track of the Temiscouata Railway, in Lot No. 240, in the Parish of St. Francis, N.B.

4561—April 6—Authorizing the Arthabaska Water & Power Company to lay, place, and maintain two underground conduits, each containing three electric power cables, across the lands and tracks of the G.T.R. on Cadastral Lot No. 461, Third Range of Arthabaska, P.Q.

4562—April 6—Authorizing Bell Telephone Company to cross with its aerial wires, the track of the G.T.R. at Brewster Avenue, Lachine, P.Q.

4563—April 6—Approving deviation of C.P.R. Company's main line and double track at Tunnel Island, mile 0.29 to mile 1.24.

4564—April 6—Authorizing the Commissioners of the Transcontinental Railway to take possession of, expropriate, use and occupy that portion of the right of way and lands of

the C.P.R. Company at or near St. Basil, N.B., and to change location of its line.

4565—April 1—Authorizing D. J. McKay, of Crossfield, Alta., to establish a crossing over the track of the C.P.R. with an additional track, at Nanton St., Crossfield, Alta.

4566—April 9—Approving revised location of the G.T.R. branch line in the town of Welland, Ontario.

4567—April 8—Authorizing Central Ontario Railway to divert the public highway through Lot 23, Concession 3, Township of Monteagle, Ontario.

4568—April 8—Authorizing the Central Ontario Railway to construct its railway across the highway at Station 403.40, Township of Monteagle, Ontario.

4569—April 8—Authorizing M. J. Costello to prepare and issue tariff of tolls to be charged upon the line of the Vancouver, Westminster & Yukon Railway Company.

4570—April 7—Authorizing Commissioners of Transcontinental Railway to take possession of, expropriate, use and occupy that portion of the right of way and lands of the New Brunswick Railway Company, about nine miles west of Grand Falls, N.B., also to deviate line of railway of the said New Brunswick Railway Company.

4571—April 7—Approving location of British Yukon Railway Company from Macrae, on main line, at Station 1905-40.8, near mile post 103, towards the Tahkeena River, a distance of 12.5 miles.

4572—March 31—Authorizing the town of Galt to put storm drain and connections under the track of the G.T.R. on George St., Galt, Ontario.

4573—April 7—Approving standard freight mileage tariff, C.R.C., No. 288, of the Niagara, St. Catharines & Toronto Railway Company, to apply between stations on its new lines, omitting its main line between Port Dalhousie and Niagara Falls.

4574—April 8—Authorizing C.P.R. to construct a branch line to and into the premises of E. & T. Fairbanks & Company, Limited, Sherbrooke, P.Q.

4575—April 9—Approving standard drawings for frame and pile trestles of the C. N. Quebec Railway upon its St. Jerome, Montford & Garneau-Quebec Divisions.

4576—April 9—Authorizing C.P.R. to construct an additional track of its railway across the public highway at Maxwell, N.B.

4577—April 8—Extending until June, 1908, the time within which the Canadian Northern Ontario Railway Company shall install interlocking and derail plant at Elbow Creek crossing with the C.P.R.

4578—December 26, 1907—Authorizing Vancouver, Victoria & Eastern Railway to take additional lands required by it for the diversion of the River Road, so called, New Westminster District, Municipality of Delta, B.C.

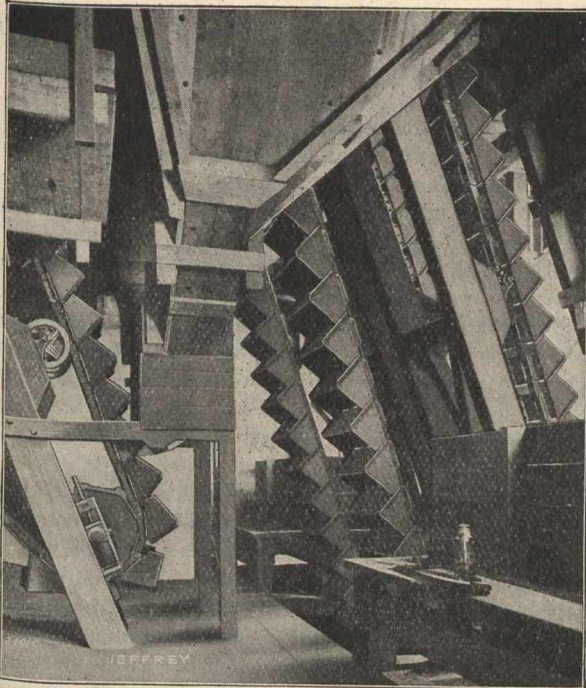
The officers of the Canadian Crocker-Wheeler Company, Limited, are well known to the electrical and manufacturing trade in Canada. Mr. F. E. Lovell, president of the new company, is a member of the old established lumber firm of H. Lovell & Sons, of Coaticooke, P.Q., who have extensive interests in mills and timber limits throughout the Province of Quebec. Messrs. Russell A. Stinson and F. Jno. Bell, vice-president and secretary-treasurer respectively, have been identified with the manufacturing, construction, and sales ends of the electrical trade in Canada for the past fifteen years, and are particularly well known in Montreal, where they are welcoming their many old friends at the head office of the company, which has recently been opened in the Street Railway Chambers, Place d'Armes Hill.

In surveying work on railroads the Yellow Crayons are used for marking various points on the rails. For such work the ordinary chalk is likely to wash off after one rain storm. Dixon's Yellow Crayons, however, will leave a clear mark for months. One case was recently reported where the marks were seen distinctly after eight months' exposure to the weather.

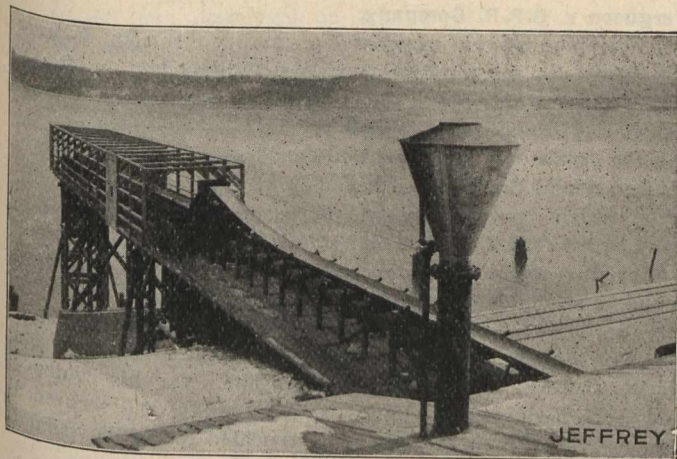
ROCK CRUSHING PLANT.

One of the largest and best equipped stone crushing and shipping plants in America has recently been completed by the Cedarcliff Stone Company at its works near Cedarcliff, N.Y.

An exceedingly interesting and important feature of this plant is the very complete system of elevators and conveyors by which the stone is handled throughout the numerous processes of preparation and shipment. This system may be divided into two parts;—First, the series of elevators and con-



veyors which takes the stone from the crushers to the revolving screens and from thence to the storage grounds, and second, the series which delivers the sized product from the storage grounds to cars or vessels as the case may be. The first system consists of three elevators and two belt conveyors. Each of these elevators is 65 feet high from centre to centre of wheels. They all are of the general types illustrated and are the same in construction and dimension of parts. Two of these elevators stand side by side and are so located that they handle the product of a No. 9 Gates Crushed and four No. 6's. The stone from each elevator is delivered into a revolving screen from which the tailings go back to two 6's on each side and are re-crushed. Everything which passes



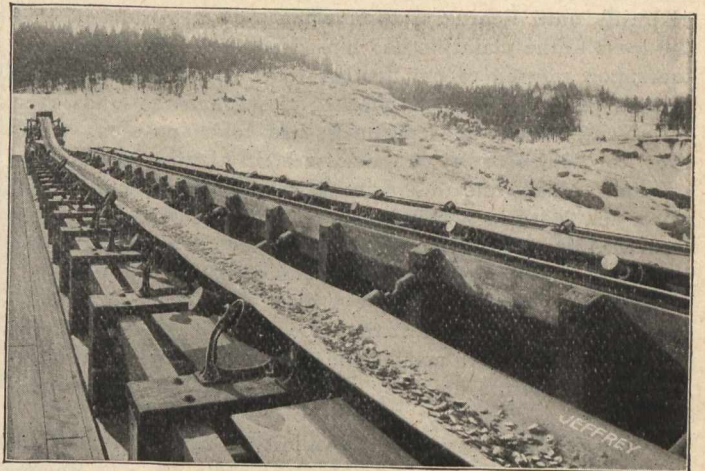
through the screens is received by the third elevator which stands directly in the rear of the other two, and which delivers it to the finishing screen in the top of the building. The finishing screen separates the stone into 2-inch and ¾-inch products, and the screenings which pass a ¾-inch hole. The screenings are carried by a 14-inch Century Belt conveyor to the north of the building, a distance of 100 feet. The 2-inch and ¾-inch products are conveyed to the storage grounds at the south of the building by two separate belt conveyors, the belt for the concrete stone being 24-inch

and the other 18-inch in width. These conveyors to the storage ground discharge the stone by means of an automatic tripper into the proper compartments for each class.

The plan of ground storage adopted by the Cedarcliff Stone Company is something unique in stone crushing plants and is, so far as we know, the first in which this arrangement has been adopted. Most stone crushing plants, as is well-known, deposit the stone in large bins, which are not only costly to erect but must be maintained at heavy expense. This ground storage plan is precisely the scheme commonly used for storing coal. The storage ground is 160 feet long by 100 feet wide, and the distributing conveyors are placed at an elevation of 35 feet, so that the storage capacity is about 8,000 cubic yards.

The distributing conveyors over these grounds rest on concrete columns placed 35 feet from centre to centre, each column being 12 feet by 7 feet in plan, and having a ventilating shaft 8 feet by 3 feet in its centre from top to bottom. Underneath the column in the centre and running the entire length of the storage ground there is a conduit or tunnel cut out of the solid rock. The cross-section of this tunnel is 8 feet by 8 feet inside measurements and its length is 160 feet. The walls and floors are of concrete, while the roof of the tunnel is formed of 12-inch I-beams set 2 feet apart and filled in with concrete. In this roof bin-gates are located six or eight feet apart the entire length. Over the tunnel, stone will be piled to a height of 35 feet.

For conveying this crushed stone to railway cars or barges, a 36-inch belt conveyor travels the entire length of



the tunnel. By opening one of the bin gates described, the stone from above falls on to the belt conveyor which delivers it to an elevator, 45-foot centres. This discharges into another belt conveyor 36 inches wide by 200 feet long, which carries it over the railway tracks to the wharf at the river's edge. The stone from this conveyor is discharged by a tripper either at the wharf for loading vessels or into a small pocket over-hanging the side tracks of the West Shore Railroad Company, where it is loaded on to railway cars.

This system of loading conveyors is designed for a capacity of about 400 tons per hour, and is operated by an independent engine so that the barges or cars can be loaded without reference to the operation of the main plant.

A conspicuous feature of this elevating and conveying scheme is the great strength of the elevators. The buckets of all are 30 inches in length, and are sustained by two parallel chains especially designed and made up for the heaviest possible work. The chains are the "Michigan" type of the Jeffrey Climax Steel Chain, except that they are made in double width in order to give greater bearing surface on the head and foot wheels. They are designed to carry a steady load of from six to seven tons and as a factor of safety in strength of about 15 is allowed, it is reasonable to suppose that there will never be any serious trouble, even though the conditions under which they work are necessarily severe.

The entire elevating and conveying system was installed by the Jeffrey Manufacturing Company, of Columbus, Ohio. It works with great smoothness and efficiency, and the management of the Cedarcliff Stone Company express themselves as being highly pleased with the installation.

LEGAL NOTES.

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

TENANT IS LIABLE FOR RENT UNTIL EVICTED—RIGHTS UNDER A MINING LEASE.

Clary et al v. Lake Superior Corporation.

On the 31st May, 1901, the plaintiffs made application for mining lease of 80 acres of land in Township of Hagar, Ontario. They proved discovery of copper, paid the rent fixed by Statute and became entitled to a lease for ten years from date. In May, 1902, they were notified that rent was due but made no reply. On the 10th August, 1902, they sublet the full 80 acres to the defendants who covenanted in the lease to keep up the Government rental and also to pay the plaintiffs' royalties which they guaranteed should amount to \$75 per month for five years. No development was done by either party, but the Corporation paid the monthly rental to plaintiffs until February, 1906, when they were advised that the lease to the plaintiffs had lapsed and been disallowed and thereupon refused to pay further rent. On the Government records the lease had been marked lapsed and the lands open for re-entry, but the department had taken no steps whatever to disturb or eject the lessees if they were on the ground. Meanwhile the plaintiffs made a fresh application, got a new lease in September, 1906, and when the five years' term was up they sued the Lake Superior Corporation for the remaining 18 months' rent at \$75 a month.

The Corporation sets up two lines of defence:—Firstly,—that the lessors had not at the time of the lease such title as would enable them to make such lease. Secondly,—that whatever title plaintiffs did have had ceased before they refused to pay rent.

The first argument has no validity at law for the tenant is estopped from denying his landlord's title. Having solemnly accepted a lease from the landlord, he is debarred from ever denying that the landlord had a good title at that time.

As to the second, the chancellor points out that the lessors' claim to rent is founded upon this, that the land demised is enjoyed by the tenant during the term of the contract. Now the tenant cannot make return for a thing which he has not got and therefore if the tenant be deprived of the demised premises, the obligation to pay rent ceases. After accepting a lease **it is the duty of the tenant to pay rent to the lessor so long as he retains possession under that lessor.** Now if another claimant by paramount title ejects him from the land the obligation to pay ceases and likewise if such holder by stronger title forces the tenant to attorn and pay rent to him, the tenant is relieved from paying to the original landlord inasmuch as he ceases to hold under such original landlord. But in this case the owner by paramount title (the Province) did not eject the Corporation from the land nor do any act whatever in that behalf. In fact they actually renewed the title of the plaintiffs so that even at the end of the term the plaintiffs were able to give the defendants full power to enter upon and develop the mine. The Defendant Corporation is not relieved from payment of rent and the plaintiffs are entitled to the full amount of their claim and costs.—11 O.W.R., 381.

It is worthy of notice that although plaintiff Clary had ceased to have any legal right in the lands in question, he was successful in securing a new lease. This is in pursuance of a policy of the Crown, and it is not unusual for the Crown to exercise its grace in favor of a locatee whose legal

claim has lapsed and in at least one case recorded such claim to favor is recognized as amounting to a substantial interest in the lands.—Couse v Clive, 19 U.C.R., 61.

LIABILITY OF CONTRACTORS AND SUB-CONTRACTORS FOR INJURY TO WORKMEN.

Kitts v. Phillips & Co., et al.

Phillips & Company were contractors for a portion of the the C.P.R. near Parry Sound (Ontario), and sub-let the rock cutting to one Montgomery. The latter in turn placed a foreman in charge and engaged workmen, amongst whom was the plaintiff Kitts. While Kitts was engaged in drilling rock at the bottom of a deep cut, a large rock from the side of the cut, and above where plaintiff was working, became loosened and rolled down the bank striking the plaintiff and causing him serious injury. The plaintiff alleged the accident was due to the negligence of those in charge and entered action against Phillips & Company, Montgomery and the latter's foreman.

On trial the evidence showed that Phillips & Company had sublet to Montgomery who was an independent contractor; **they had no control over him**, and no say as to **how** the work should be done, their only claim was that he should duly complete the cutting; consequently they could **not be liable for his acts**, and the case was dismissed as against Phillips & Company. The Court further held that it was the duty of the foreman and of Montgomery himself to see to the removal of all loose or overhanging rocks from the sides of the cuts, and in short to keep everything in safe condition so that workmen below might not be injured. By the foreman's negligence—the rock which injured the plaintiff was not removed and both he and his employer Montgomery are liable in damages to the plaintiff. Judgment for the plaintiff \$1,200 against defendant Montgomery and his foreman.—(Teetzel, J., December, 1907).

INJURY AS RESULT OF BROKEN RAIL—PLAINTIFF MUST PROVE NEGLIGENCE.

Ferguson v. C.P.R. Company.

The plaintiff was employed as mail clerk upon a train which when a few miles west of Fort William left the tracks owing to a broken rail. The plaintiff was injured in the accident and brought this action for injuries sustained, alleging the occurrence to be due to defendants' negligence. There was no denial that the rail broke from the impact of the engine, which was a heavy freight engine, when rounding a bend in the road described as a 2.30 degree curve.

In answer to questions submitted to them, the jury found the defendants guilty of negligence in drawing a first-class train with a heavy freight engine at an excessive rate of speed on a curve, and that the breaking of the rail was caused by the force of the impact of the engine. On this evidence and these findings the plaintiff was successful and secured a verdict from which the company appealed to the Divisional Court.

In giving judgment the latter Court points out that the plaintiff has failed to prove negligence on the part of the Company. He has shown that the train was travelling at 40 miles an hour and was a somewhat heavy engine for passenger traffic, but this itself does not prove negligence or lack of care against the defendants. On the other hand, they produce evidence that their passenger trains have a schedule rate of 36 miles per hour on that part of the road and one expert swears it would be safe for them to make even 100 per hour on so slight a curve. Thus if the accident itself raised

any presumption against the defendants they have in turn met that presumption with a good defence and the plaintiff was bound to make out his case by positive evidence of carelessness, neglect or reckless driving. But there was no evidence that it would be unsafe or improper to drive the engine in question at a speed of 40 miles per hour, and there was no evidence of any defect in the rail, which the company might have discovered by exercising due diligence or care. **The evidence is quite as consistent with the break being due to a latent defect in the rail—the existence of which the company could not detect, and which would therefore not constitute negligence, or due to great changes in temperature, as with its being subjected to any unduly excessive strain. Now the plaintiff is bound to produce convincing evidence of negligence, and as he has failed in this he cannot succeed.** The verdict is set aside and the action dismissed.—11 O.W.R., 470.

NEGLECT TO OBEY RULES.

Harris vs. London Street Railway Company.

The plaintiff was a motorman on one of the company's cars and under a duty to conform to the rules of the company, one of which read as follows:—"When the power leaves the line the controller must be shut off, the overhead switch thrown and the car brought to a stop." On the occasion in question the power on the plaintiff's car had been weak for some time and when he passed a point on the line where there was a circuit broken it failed entirely. He shut off the controller but did not apply the brakes, and the car ran ahead by its own momentum until the collision occurred with a car in front, though it was admitted that his car could have been stopped in time to prevent the accident, and he admitted that he would have done so had he known the other car was in front.

The motorman claimed damages from the company and the trial judge left the question of the company's negligence to the jury, who, strange to say, found in favor of the plaintiff. Upon the case coming up by way of appeal the Supreme Court of Canada state that even upon the plaintiff's own evidence the accident was due to his disregard of the company's rules to which it was his **duty to conform**, and therefore having failed to make out even a prima facie case, the question should never have been submitted to the jury. The proper course was for the trial judge to explain that the plaintiff, being himself guilty of contributory negligence, he was not entitled to succeed whether the defendants were also guilty of negligence or not—and then to have dismissed the action.

Action was dismissed on appeal with costs.—39 Can. S.C.R., 398.

This decision is English law, and not in accordance with the practice in Quebec, where the case would possibly have been decided otherwise:—Thus in Quebec the Court would attempt to ascertain to what extent the plaintiff was responsible and to what extent the company, and, if both were equally guilty of neglect or improper conduct, they would award the plaintiff one-half only of the damages to which he would otherwise have been entitled. In all other Provinces of the Dominion, English Common Law is in force, and if a plaintiff be himself in any degree responsible for the occurrence he cannot recover damages.

Wright et al vs. Davies.

Plaintiffs, who were architects in the city of Montreal, sued to recover \$555 from defendant for professional services in preparing three separate sets of plans for a house. Defendant pleaded the plans were not according to the conditions previously agreed upon between the parties, inasmuch as he instructed plaintiffs to prepare plans for a house to cost about \$5,000, whereas the lowest tenders on the three varied from \$7,000 to \$10,000. The court below found that the three contracts **being civil contracts for amounts each in excess of \$50, they did not admit of being proved by parole testimony**, and as there was no commencement of proof in

writing either in defendant's deposition or in the written pleadings, and that the defendant's admissions were indivisible, and that the parole testimony offered in support of the said contracts was illegal and objected to in time, the action was dismissed with costs. Judgment affirmed on appeal to Superior Court.—Martineau, J., January 21, 1908.

Note.—Parole evidence is oral or verbal evidence as distinguished from that which was put in writing. The "Statute of Frauds," passed in the reign of Charles II., and still in force, provides that a contract for goods, wares or merchandise exceeding \$40 in value, shall not be proved in court by purely verbal testimony. Thus in this case plaintiffs had not secured any written agreement and consequently had to rely on purely verbal statements, which the Statute declares insufficient; consequently they fail.

There are exceptions—where something has been paid to bind the bargain or where part of the goods have been delivered, the plaintiff is allowed to prove his case by parole evidence.

ENGINEERING SOCIETIES.

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

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

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

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

QUEBEC BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, E. A. Hoare; Secretary, P. E. Parent, Po. 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. April 30th, the Quebec Bridge Disaster, by Mr. John Galbraith.

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

ENGINEERS' CLUB OF TORONTO.—96 King Street West. President, J. G. Sing; secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter months; April 16th, Improvements in the Manufacture of Steel.

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

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

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

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.

Belliss & Morcom, of Birmingham, Eng., through their agents Laurie & Lamb, have received an order for a Belliss triple expansion 720 B.H.P. engine from the Dominion Iron and Steel Company, Sydney, N.S. They have also installed a Belliss 380 B.H.P. engine directly connected to a general electric dynamo for the Edward Partington Pulp and Paper Company, St. John, N.B.

CORRESPONDENCE.

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

DESIGNS FOR QUEBEC BRIDGE.

Sir,—Having had opportunities to note the progress of the erection of the Quebec Bridge during 1906-7, and also of being on the ground after the disaster, the writer has taken more than ordinary interest in that great national work, and, in view of the probability of rebuilding the structure, begs to submit a design and a brief article embodying a few condensed facts and views as they appear to him.

Sketch B shows a design and layout which would meet existing conditions on the ground, and give the public the desired assurance of safety.

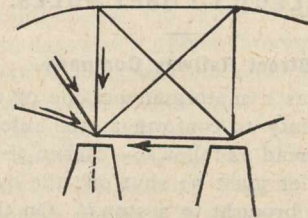
The proposed design provides for braced towers similar to the Forth Bridge (except transverse batter and the number of piers), necessitating one new pier under each tower.

The tower could vary in length from 175 feet to 200 feet to suit conditions at end of bridge. The anchor arms remain

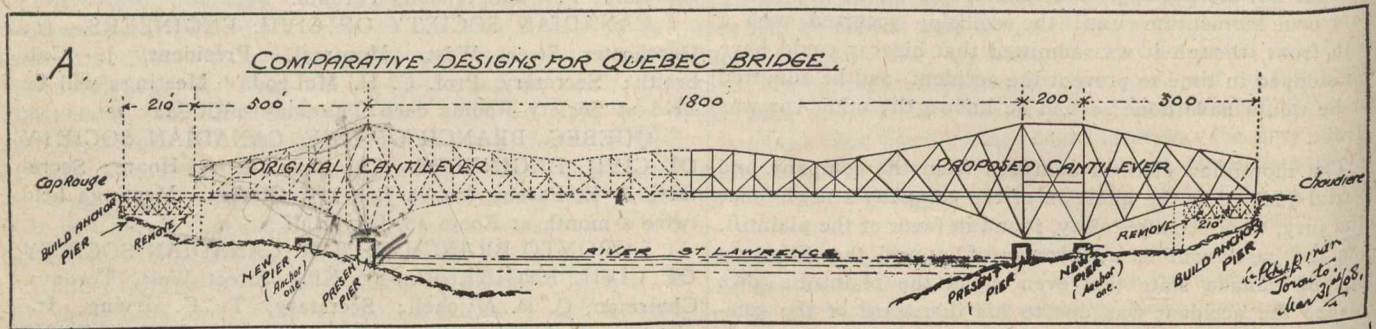
In the original design the corresponding load, together with the lower half, passes through the lower chords.

The former exhibits the essential feature in erection—which determines the success of the structure.

Further.—One post of each tower of the Forth Bridge is anchored to the pier by forty-eight 2½-inch rods built into the body of pier. This, for all practical purposes, fixes each tower and makes each half tower self-supporting against such stresses as may develop in members directly supported by the two posts or half tower, and enables the piers to absorb the stresses or thrust direct-resolved as:



and prevents any excess stress in lower members of one arm of cantilever being transmitted to lower members of the other



same length as in original design, and also the suspended span. This would bring the ends of anchor arms approximately on the land abutments. To carry out this plan, the approach spans of 210 feet each must be eliminated. These approach spans could be cut out, removed to new site and erected at probably one-third of their original cost; or possibly lowered intact on blocking to tide water, and towed on scows to some convenient site.

A glance at Sketch A. (Comparative designs) will convince one of the superiority of the Forth design over the ill-

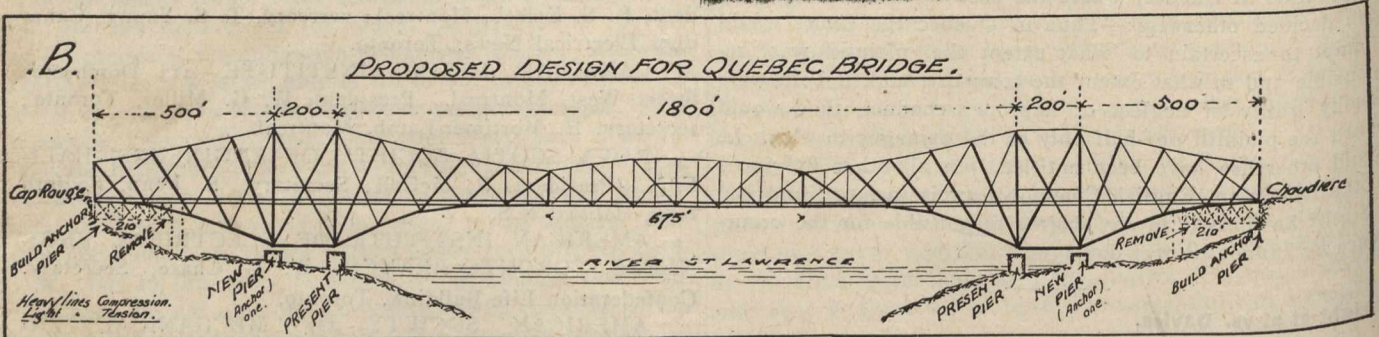
arm, and for erection purposes the advantages are manifest.

The above will upset some mistaken theories extant on this point.

Conditions were not similar with the Quebec structure nor practicable to such a degree.

It is apparent the erection stresses in the original design were under-estimated.

Had it been possible to erect the structure on falsework and join the chain of eyebars of the upper chords of cantilever with the members of the suspended span results would



fated single post. The advantages of the former in erection cannot be overestimated—it is a design especially providing for erection stresses, a feature lacking in the original.

Note Sketch C,—the shaded portions of the two towers—the enormous overhanging load U U L of the Forth design (approximately 200 feet, nearly 2,000 tons), causes no stress in the lower chords, this stress being transmitted direct to pier through compression members P., leaving the lower chords free to take up stresses developing from further projection and suspended span.

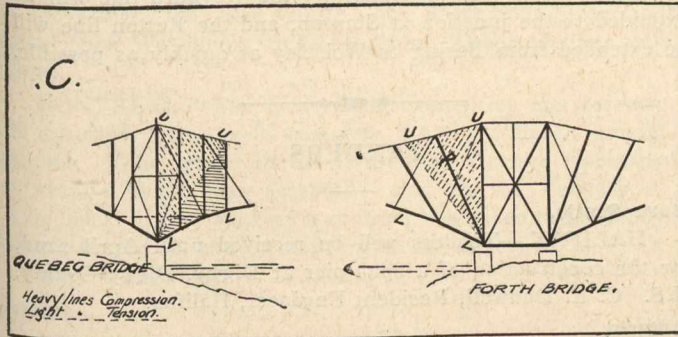
have been entirely different—the immense chain of eyebars would have taken their proper initial loading, and such stresses as caused the failure of the Quebec Bridge would not have developed.

Following the method of erection adopted, the fact of successfully connecting or coupling up such a design of such a span would not relieve the lower chords near main posts of their already acquired loading, and should not be accepted as positive proof that the structure is a safe one. The recent failure should be sufficiently convincing of this.

Further, assume the defective chords had been double the strength, place on the floor system deck timbers, roadways and remainder of half suspended span—the latter approximately 600 tons at extreme end of cantilever—where would the factor of safety be? Clearly, the design is impracticable for the Quebec span, and no Engineer or body of Engineers would be rash enough to repeat the experiment.

It is evident there was too much theory in the design.

Szlapka, the designer, in his calculations followed theoretical lines—expecting the composite parts to act as a large unit.



Mr. Cooper, Consulting Engineer, calculated that the excess dead load would increase the stresses 10 per cent.

Mr. Lure, Assistant Engineer, calculated that the weight of the large traveller would increase the stress 50 lbs. per square inch.

All calculations, we presume, along the same lines—and some almost to a decimal; yet the basis, or very foundation of their calculations, was an assumed weight, and when the latter were made the bridge had for days been on the verge of collapse—showing how wildly astray all their calculations must have been.

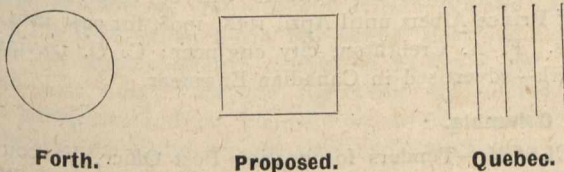
At present we have nothing in practice to indicate to us what stresses the members of a bridge undergo from varying loads. But is it not a late day to say that Engineers have no reliable data from which to design large columns?

Twenty-five years ago Benjamin Baker concluded from his researches and experiments that compression members of large dimensions were strongest in tubular form, preferably circular. He adopted the latter and at same time recognized the fact that some allowance must be made for workmanship and lack of unity in large columns of large dimensions, and adopted a reasonably low unit of stress.

His work stands to-day the most admired of the world—without a tremor from its passing loads.

In the rebuilding of the Quebec Bridge, while there may be a desire to utilize the present defective chord members, it should not be entertained for their original positions; possibly some sections could, when reinforced, be used as lower struts of towers, but no amount of reinforcing of these members in their original positions will restore public confidence in their strength. The main compression members should be tubular of box form—preferable to circular—for construction purposes only.

Of the three forms below—tested and tried, and in general use, the designers of the Quebec Bridge appear to have used the weakest:



A work of such magnitude should not be shadowed by a vestige of doubt as to its stability. Apropos of this an extract from the history of the Forth Bridge:—

“The chief desiderata in the Forth Bridge.

1. “The maximum attainable amount of rigidity—so that the work when completed may by its freedom from vibration gain the confidence of the public.

2. “Facility and security of erection so that at any stage of erection the incomplete structure may be as secure against a hurricane as the finished bridge.

3. “That no untried material be used in its construction.

4. “That the maximum economy be attained consistent with the fulfillment of the proceeding conditions.”

The main compression members are steel tubes ranging up to 12 feet in diameter, the tubular form being adopted for two reasons; firstly, because experiments have shown that inch for inch the tubular form is stronger than any other; and, secondly, because the amount of stiffening and secondary bracing is thereby reduced to the lowest percentage.

It might be thought that columns 350 feet in length were an untried novelty. But this is not so, as we have the precedent of the Saltash Bridge oval tubes 16 feet 9 inches by 12 feet 3 inches in diameter, 460 feet in length, the strain upon which under the test load was higher per square inch than will be that on the steel columns of the Forth Bridge.”

A complete history of the Forth Bridge to hand enables the writer to quote of that masterpiece of engineering skill and thoroughness.

Concluding, the failure of 1907—much to be regretted—should be an object-lesson conducive to further research, and the hope is expressed, that the future Quebec Bridge will stand a monument to the skill and success of Canadian Engineers.

Walter P. Chapman, M.C.S., C.E.

Toronto, April, 1908.

LOCATION OF QUEBEC BRIDGE.

Sir,—I have just read the letter signed by “Rem Defero,” appearing in the Montreal Star, condemning the location of the Quebec Bridge, stating that it was an ill-chosen, extravagantly, expensive, and dangerous site, and suggesting a crossing at Grondines. This bridge was required as near Quebec City as possible so that all through lines might be operated into that city with the minimum extra mileage and for other commercial reasons. The site chosen was the narrowest crossing within a reasonable distance of Quebec, and I yet fail to see it is dangerous. Grondines, the place suggested, is some forty miles up the river from Quebec, and the estimate that a crossing here would cost two or three millions while to replace the superstructure of the Quebec bridge would cost ten millions is absurd. A bridge at Grondines with the necessary elevation to clear shipmasts and with possible depths of foundations unknown would run much closer to, if not as much, as the cost of the Quebec Bridge.

It must be remembered that the money spent by the Quebec Bridge Company included surveys and construction for several miles upon south and north sides of river, double track to Cap Rouge, line into Quebec City, yards, viaducts and approaches, besides the piers and abutments of the bridge itself.

This writer, “Rem Defero,” also suggests that a light traffic suspension bridge be placed on these piers so that they be not wasted. As this bridge is about five miles from centre of Quebec business section, is it at all likely that people would go that distance, across and thence back to Levis about the same distance when the ferries would get them across in half the time, and by the way, these ferries are held up only a few days in the year.

The Quebec Bridge as first suggested was a suspension bridge, but none of the large bridge cable manufacturers would tender for that span or would require several years to complete the cables. Would not that yet hold, and would not the cost of such a traffic bridge with high towers be nearly as great as a railway bridge? Certainly, combined with the suggested one at Grondines, with necessary approaches and yards the cost would be far greater and would not fulfill the requirements of the bridge at Quebec.

Faithfully yours,

Andrew F. Macallum.

Toronto, April, 1908.

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.

RAILWAYS—STEAM AND ELECTRIC.

Quebec.

QUEBEC.—The Delaware & Hudson Railway Company have purchased the Quebec, Montreal and Southern Railway, for the purpose of protecting the supply of pulpwood necessary for the continued operation and enlargement of the paper mills already located along the line of the Delaware & Hudson. This line will be completed to Ste. Philomen by July 1st, and eventually to the terminus of the Quebec Bridge, to secure connection with the city.

Ontario.

ST. MARY'S.—The town has carried a by-law empowering the council to grant the St. Mary's and Western Ontario Railway \$40,000 of debentures.

BRANTFORD.—The Grand Valley Railroad will commence reconstruction as soon as the condition of the ground permits. Mr. W. A. Verner, president of the company, states that the line from Brantford to the Galt terminus was to be torn up and new 80-pound rails substituted. Other improvements will also be made.

BROCKVILLE.—The Townships of Bastard and Burgess South have decided to postpone definite action in the matter of bonusing the proposed Ottawa-Kingston Railway, until another meeting of the council is held.

FORT WILLIAM.—The crane consigned to the G.T.P. has arrived, and is in the C.P.R. yards. It is the largest crane in Western Canada, and has a lifting capacity of fifty tons. It will be used on this end of the G.T.P.

BARRIE.—The council of the town and the G.T.R. have at last reached an agreement respecting the extension of the company's shops at that town. The main clauses of the agreement are:—The G.T.R. is to build the new shops within three years, though not compelled to start at any particular time. If shops are destroyed by fire and reconstruction not commenced at once the agreement becomes null and void. Barrie is to be maintained as a divisional point.

Manitoba.

WINNIPEG.—Before April 15th, the Grand Trunk Pacific will be handling their own material and supplies straight through from a short distance west of Winnipeg to Saskatoon. The entire distance between Winnipeg and Saskatoon is 478 miles, and when the gap is closed in the next two weeks there will be 414 miles available for use. The track will not be ready at that time for traffic. On the whole line from Winnipeg to Saskatoon there are 37 miles of track to be laid to make the steel complete and there are 250 miles to be ballasted.

Saskatchewan.

SASKATOON.—Work on the Grand Trunk Pacific directly east of Saskatoon has been held up very much during the past month by heavy snow. The snow was so heavy on the C.N.R. along the Regina-Prince Albert line that there was a blockade during the last week in March.

MOOSE JAW.—The statement to the effect that the contract for the construction of the second fifty miles of the projected railway from Moose Jaw to Lacombe is only partially correct. The work is not to be abandoned but its completion has been deferred in order that all the company's force and energies may be concentrated in the completion of other lines where gaps remain to be closed up. The grade for the first fifty miles of the Moose Jaw line has been built, and the track-laying will be completed forthwith. The work of com-

pleting the Kirkella-Asquith line from Asquith to Hardisty will be prosecuted energetically. The Sheho line will be finished to main line at Lanigan; the Weyburn line will be extended to the junction at Stanton, and the Reston line will be extended from Baring to Wolseley as quickly as possible.

TENDERS.

Nova Scotia.

HALIFAX.—Tenders will be received until April 22nd, for the construction of a span-pier at Digby, Digby County, N.S. C. E. Dodwell, Resident Engineer, Halifax.

Ontario.

ST. THOMAS.—Tenders will be received until April 24th, 1908, for:—(1) Concrete arch bridge over Kettle River. (2) Concrete arch bridge over Catfish River. (3) Concrete beam span over Catfish River. James A. Bell, City and County Engineer. Advertised in Canadian Engineer.

OTTAWA.—Tenders will be called for until May 1st, 1908, for 3,974 fathoms of chain with shackles and swivels. F. Gourdeau, Deputy-Minister of Marine, Ottawa.

GUELPH.—Tenders will be received until April 20th, 1908 for 21,000 lineal feet of 24-inch sewer pipe. Davis & Johnston, Engineers, Berlin; J. J. Hackney, Manager Guelph Waterworks—advertised in the Canadian Engineer.

BRANTFORD.—Tenders will be received by Secretary of the Board of Water Commissioners, Brantford, until April 24th, for the following:—(a) The construction of a storage reservoir. (b) The furnishing and laying of about 850 feet of 24-inch cast-iron suction pipe. (c) The furnishing and laying of about 1,150 feet of 15-inch, 18-inch, and 24-inch sewer conduit pipe. T. H. Jones, City Engineer.

Manitoba.

WINNIPEG.—Tenders are asked by the Canadian Pacific Railway for Y.M.C.A. building at Kenora. Frank Lee, Division Engineer.

VIRDEN.—Tenders will be received up to 10th day of May 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 Wallace. James F. C. Menlove, Secretary-Treasurer.

PORTAGE LA PRAIRIE.—Tenders will be received until April 13th, 1908, for pumping machinery, water pipes, etc., for the City of Portage la Prairie. F. W. Clayton, Sec.-Treas.; Willis Chapman, engineer—advertised in Canadian Engineer.

Saskatchewan.

PRINCE ALBERT.—Tenders will be received by the town of Prince Albert until April 16th, 1908, for cast iron and specials. F. A. Creighton, city engineer; C. O. Davidson, city clerk—advertised in Canadian Engineer.

British Columbia.

NELSON.—Tenders for heating Post Office, Vancouver, B.C., will be received until Saturday, April 25, 1908. Plans and specifications may be had from Mr. W. Henderson, superintending architect, Victoria, and from Mr. Charles Tossell, Clerk of Works, Vancouver, B.C.

A meeting of the directors of the British Columbia Agricultural Association was held recently, when it was decided to call for tenders for the \$12,000 building which, with others, will be erected.

CONTRACTS AWARDED.

North Toronto.

The Canada Foundry Company's tender for six-inch water pipe, at \$35.80, for the year's supply, has been accepted.

Quebec

MONTREAL.—The Council at Notre Dame de Grace have awarded the contract for two important sections of the new sewerage system to Messrs. Henault & Hefferman, for the sum of \$70,000. One section extends from the little River St. Pierre to the Upper Lachine Road, thence to the Hospital for Incurables; the other will lie along Sherbrooke Street and extend from Westmount to Kensington. Other sections will follow.

MONTREAL.—The Civic Road Committee met recently and awarded contracts to complete the department's annual supplies. The tender of the Laurentian Granite Company for granite blocks was accepted; and for the delivery of scoria blocks on the wharves a contract was given to the Sicily Asphalt Company, and for delivery on the streets to the F. D. Lawrence Company.

Manitoba.

WINNIPEG.—The contract for the Winnipeg examining warehouse has been awarded by the Dominion Public Works Department to J. McDiarmid for \$276,000.

SEWERAGE AND WATERWORKS.

Ontario.

TORONTO.—In the case brought by Mr. Dorst, a butcher, of Toronto, against the city for damages for injury to his property through the latter's alleged negligence, damages have been contingently assessed at \$300 in order that a second trial may be avoided if on appeal it shall be held that the city is liable. The damage was caused by flooding from a sewer in course of construction. The defence was that the sewer was being constructed by an independent firm of contractors, for whose acts the city were not responsible.

BRANTFORD.—The plans for the waterworks extension have been completed and the work has been staked out and will be commenced as soon as the ground is fit. T. H. Jones, City Engineer.

BARRIE.—The town council will have Mr. C. H. Mitchell, C.E., Traders Bank Building, Toronto, investigate and make a report and estimate upon a complete sewerage system for wards five and six. These wards include the former village of Allandale and that portion between Allandale and Barrie.

British Columbia.

LADYSMITH.—Mr. Mahone, C.E., Victoria, B.C., has been employed by the town of Ladysmith to submit plans and cost for a city sewerage system.

LIGHT, HEAT, AND POWER.

Ontario.

GLENCOE.—Tenders wanted for electric lighting for the village of Glencoe, Ont. George Wilson, Village Clerk.

NORTH BAY.—The North Bay Light, Heat and Power Co. offer to supply electric energy at 12 cents per one thousand watt hours. Certain reductions are offered for prompt payments and no competition, which brings the rate down to 10¾ cents per one thousand watt hours.

MISCELLANEOUS

Nova Scotia.

SYDNEY.—The executive of the Marine and General Engineering Company completed the necessary arrangements in the taking over of a site for their proposed works. The property adjoins the Indian reservation on Kings Road.

Quebec.

MONTREAL.—This city has decided to apply a sum of \$2,400,000 to permanent works, street paving and repairs to streets.

Ontario.

BRANTFORD.—The Sand-Lime Brick Company have received an extra large order for 500,000 brick from the Borden Condensed Milk Manufacturing Company. This company have now decided to build a factory at Tilsonburg, Ont.

TORONTO.—The Sunbeam Incandescent Lamp Company, of Canada, Limited, offered to purchase from the city 100 feet of land on the east side of Dufferin Street, for the purpose of erecting a factory thereon.

TORONTO.—Government Engineer Sing, has decided on the repairs necessary to be made at once to Toronto Island defences in consequence of the recent big storms. Engineer Sing decided to re-pile the place where the temporary sheet piling was, and to make the necessary protection pending the letting of the contract by the Government for the permanent work. Mr. Sing will begin operations on Monday.

BELLEVILLE.—The Toronto-Belleville rolling mills of this city will open again on Monday, after being shut down nearly all winter. The horseshoe plant will open in two or three weeks.

Manitoba.

WINNIPEG.—At a meeting of the civic hospital committee held recently, it was decided to recommend to council that a by-law be submitted to the people at early date to authorize an expenditure of \$225,000 for hospital purposes.

Alberta.

EDMONTON.—The electors of Edmonton to-day granted a franchise to the American-Canadian Oil Company for an extension of the pipe line from their property at Morinville to the city, and the laying of the mains along the streets. The company proposes to furnish the city with natural gas for lighting and domestic purposes.

British Columbia.

VICTORIA.—By-laws to authorize the city to raise \$210,000 will be submitted to the city ratepayers. The estimates are now complete. These are the Salt Water Fire Protection By-law, to raise \$70,000 for the installation of the high pressure plant; the School By-law, to raise a like amount for the purchase of two sites and the erection of a school in the northern portion of the city; the Additional Fire Protection By-law, under which \$20,000 will be raised for extra equipment, and fire halls, and the Sewer Loan By-law, to raise \$50,000 for sewer work. All four by-laws were completed as far as the council can go and will be submitted to the ratepayers on Thursday, April 16th.

VICTORIA.—Mr. Ashcroft, engineer in charge of the irrigation work on Lord Aberdeen's ranch, Coldstream, Okanagan, has been brought by the British Columbia Government to Victoria to report on the water question in dispute between the city, the Esquimalt Waterworks Company, and the British Columbia Electric Company.

PERSONAL NOTES.

MR. SAMUEL GROVES has been appointed editor of the Geological Survey publications, Ottawa, Ont.

MR. JOHN M. WILSON has been appointed construction engineer for the Wood Product Co., of Toronto.

MR. PHILIP FAIRBAULT, Chief of the Engineering Bureau, New York, will on May 1st become Chief Engineer of H. I. Moyer Engineering and Construction Co.

MESSRS. T. B. SPEIGHT and A. J. VAN NOSTRAND have returned from a two months' trip to Lake Abitibi, where they have been making a survey of the islands in the lake.

MR. LEO DOUGHERTY, chief clerk of the assistant traffic manager of the C.P.R., has resigned to accept the

position of traffic manager for the newly-organized Inland Navigation Company.

MR. P. W. SOTHMAN, Chief Engineer of the Hydro-Electric Power Commission, who recently made an investigation of a large 100,000 volt transmission system of the Grand Rapids Muskegon Power Company at Muskegon, Mich., has returned home.

MR. A. H. BEARS, C.P.R. bridge and building master, of Winnipeg and district, has been transferred to another division, with headquarters at Saskatoon, to which point he will shortly remove. Mr. Bears is at present enjoying a vacation preparatory to assuming the duties of his new position.

MR. E. E. KELLER, for over twenty years connected with the Westinghouse interests and for fourteen years vice-president of the Westinghouse Machine Co., having completed his duties as receiver and general manager, severed his connection with the management of that Company on the 1st of this month.

OBITUARY.

Stephen Tomlinson, who has been superintendent of the Brantford Waterworks Department for thirty years, died suddenly at his home in that city on April 8th. He was about seventy years of age, and was in charge of the waterworks before the city took them over as a municipal service.

SOCIETY NOTES.

Regina Architectural Association.

The following officers have been elected by the Regina Architectural Association:—President, F. Chapman Clemesha; vice-president, E. M. Storey; secretary-treasurer, W. B. Van Egmond; committee, W. W. Hilton, George E. Hutchison, Walter J. Coltman.

Engineers' Club, Toronto.

At the last meeting the subject for discussion was Canadian Forestry Problems. Dr. Galbraith, who introduced the subject, spoke of the character of the trees, denoting the average character of the country. The reforestation of the prairies was one of the problems. There should be some method of planting the trees that will baffle or moderate the winds that now have a full sweep across the prairies, another thing was to prevent forest fires, which were the cause of great loss. One of the principal causes of fires was the way the bush was left by the lumbermen, and the railway passing through the forests were perhaps more dangerous than careless lumbermen. Fires are infrequent where lumbermen and railways are not present. Great fires do sometimes occur, but fires in north are exceptional. The coal-burning locomotives now seemed to be as dangerous as the old style that burned wood. Government rangers were taking steps as far as possible to prevent fires. Time will come if we wish to reforest our country, we will have to be assisted by men with scientific training.

Prof. Louis B. Steward also spoke on the danger and prevention of forest fires. While working in the neighborhood of Cedar Lake he found it unwise to light fires on moss-covered ground. Even when drenched with water it will smoulder for days and spring up again. It seemed almost impossible to put it out. Fires should always be lighted on bare ground.

Mr. J. G. Sing said that his impression when in the North-West was that it had all been forest, on banks of streams, or in deep ravines, where naturally protected timber was still growing, otherwise fires had entirely destroyed the timber.

Mr. F. L. Somerville did not think that Profs. Galbraith or Steward had touched on the vital question. In his opinion, we as citizens of Ontario, are more deeply interested in the forests than the lumbermen. He had read that morning, that the country (China), we consider the most backward in estab-

lishing a school of forestry and proposing to replant vast stretches of country so they can take care of the water supply, which was more important than lumbering and pulpwood. With us it was a question of reforesting those parts of Canada good for nothing else. Preserve the forests round the head waters of our rivers. There should be a systematic and scientific system of lumbering. Trees as they approached maturity should be cut down, removed, and brush destroyed, not denude the country of forests for the sake of a few dollars an acre and leave the land bare so that in the spring when the snow melts the water all runs down at once, washing away the soil, and the rest of the year what should be considerable streams are nothing but trickling rills. He emphasized the necessity of protecting the head waters by reforestation and benefit every farmer and every town through which the stream passes.

Mr. S. Gagne spoke briefly of the pulpwood industry in China where they cultivated a special growth for that purpose. He said:—"We will have a supply of pulpwood to supply the world if our forests are properly taken care of. Swamps should have been preserved as forests. Head waters of the rivers in these swamps, and should not have been settled. The land is not good for anything else. In the driving season in the lumber camps the men had orders always to light their fires on clear ground. Confirmed Prof. Galbraith's statement that railways were the source of great danger to the forests, and Prof. Steward's remarks with regard to people who made fires in the moss. Lightning also a source of forest fires, the striking of a dry birch would set the whole forest on fire. The Government, he understood, was to spend twenty-five to thirty thousand dollars to elaborate a forestry scheme. In Germany every man who wanted to plant trees on his property was furnished with the trees free of cost to encourage individual effort. He had seen two planted forests, one of 500 acres and one of 100 acres. The cost is very great with no immediate returns. The kind of trees suited to the land were planted about 4 feet apart and afterwards thinned out. Much was to be done in the way of scientific lumbering. In Quebec, where people own large tracts they could be made perpetual producers. Would entail more cost at first but in the long run would be much cheaper than every year buying more limits to replace those spoiled.

Mr. J. C. Sieman gave a description of forestry in Germany. No stumps were left and they set to work to replant as soon as the trees were cut down. From forests the German Government had millions of dollars of revenue. During recent visit to Germany where his uncle was chief ranger, he had found the whole country dotted with forests, not only beautiful but protected the streams, and were of great benefit to the country. We must go ahead without looking for immediate returns to present generation, but would be an immense boon to generations to come. The supply in the United States was approaching exhaustion, and they were looking to Canada to supply lumber for manufacturing purposes. In Mexico there were no forest fires, owing to the perpetual green growth all the year. In Europe there were no forest fires because the forests were kept clean. Wood was so valuable that every stick was picked up. There was not enough capital in this country to develop it as it should, but every young man should be willing to help, and it could not be started too soon. In the north when he was a boy, there were rich, strong streams in which he used to go fishing, were now little bits of ditches with no water, owing to the forests being cut down and consequently the country dried up.

Prof. Galbraith spoke of a forest he had seen of jack pine, varying in size from a pipe-stem to an inch in diameter, and growing as thick as hay, so close that a rabbit could not get through. His theory was that it was once a fine forest and the cones on the ground had escaped the fire and sprung into life.

Mr. T. C. Irving, Jr., spoke of the millions of dollars being spent by the State of Ohio on building dams and conserving the water supply.

Mr. T. Aird Murray, C.E., of Leeds, England, who said that with Mr. Charles Hensall, engineer for Leeds City Council, he

had gone to the locality from whence originated part of that city's water supply, and he found that trees were being planted all around the smaller streams. In explanation of this Mr. Hensall said it had been demonstrated that every square foot of ground in an area covered with trees held at least 35 per cent. more water for a fortnight after rain than did a square foot of land devoid of trees. This meant that by judicious tree-planting the great city of Leeds was increasing the capacity of its reservoir by 35 per cent.

PRESERVE YOUR BELTS.

There are thousands of belts standing idle at the present time in mills and factories all over the country. Nothing weakens belting quicker than to let it hang for any length of time in one position. It readily dries out and loses its pliability when not being used, and when started in operation again it commences to slip over the pulleys to such an extent that the heat generated very often burns the surface, making it hard and slippery.

When an establishment is closed down the first thing that should be done is to relieve the belting of all strain if possible, and give it a coating of a good preservative. There are a number of these preservatives on the market, and the outfit will be repaid in the efficiency of the belting when the plant is started again.

Through the courtesy of the F. S. Walton Company, of Philadelphia, Pa., we are able to make a very liberal offer to our readers. They have assured us of their willingness to send a can of their Oxoilox belt dressing free of charge to any belt user, merely as an advertisement. In this way you will have an opportunity to test its merits without it costing you one cent. You run no risk, as Oxoilox is made from the highest grade neatsfoot oil, and is therefore a splendid leather tonic; it adds new life to old and practically worn out belts, making them limber up, grip the pulleys and run for years. Mention this paper when writing, stating number and average size of belts in use.

The Smart-Turner Machine Co., of Hamilton, are continually booking orders. Among their recent orders is one for a duplex pump for the new dredge for Toronto harbor, and underwriter fire pump for G.T.R. Co., and a seven-ton hand-power travelling crane for the Galetta Electric Light and Milling Co., of Ottawa.

The Haskett-Moore invention which claims to have discovered a direct method for treating iron ore and converting it into iron and steel by one continuous process has, it is reported, sold its Canadian patent right guaranteeing a reduction in cost of 17½ per cent. as against present methods.

MARKET CONDITIONS.

Toronto, April 14th, 1908.

Business for the week has been fairly active and prices steady in most lines. Cement, lumber and other building supplies maintain their prices at a fair demand. There is a good demand for manufacturers' supplies, and the volume of business in sight for those lines is encouraging. The opening weeks of April have developed a little more business, and it is believed that a more active buying period will be seen in the course of a few weeks.

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

Antimony.—Quiet, but inquiries are coming in more freely; we quote 10 to 11 cents.

Bar Iron.—\$2 base, from stock to the wholesale dealer.

Beams and Channels.—\$2.50 to \$2.75, according to size and quantity; angles, 1¼ by 3-16 and larger, \$2.55; tees, \$2.80 to \$3 per 100 pounds. Extra for smaller sizes.

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

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

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

Building Paper.—Plain, 32c. per roll; tarred, 40c. per roll. Demand up to average for the season.

Bricks.—Common structural, \$9 to \$10 per thousand, wholesale; small lots, \$12; there is a good demand. Red and buff pressed are worth \$18 at works.

Cement.—Price of Canadian makes to the dealer in 1,000 barrel lots and up is \$1.75, in cotton bags, on car, Toronto. The dealers' price to the contractor up to car-load lots without package price, are general at \$1.80 per barrel in cotton bags and \$2 in wood, weight in each case 350 pounds. Most builders are booked for year's supply. Prices firm.

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

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

Felt Paper—Roofing Tarred.—Market steady at \$2 per 100 pounds. In moderate request.

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

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

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

Ingot Copper.—Has been fluctuating abroad, and a good deal sold for forward delivery in the belief that prices are going up. Local price continues at 14 to 14½c.

Iron Pipe.—Black, ¼-inch, \$2; ¾-inch, \$2.25; ½-inch, \$2.72; ¾-inch, \$3.68; 1-inch, \$5.28; 1¼-inch, \$7.20; 1½-inch, \$8.64; 2-inch, \$11.50; 2½-inch, \$18.40; 3-inch, \$24.15; 3½-inch, \$30.40; 4-inch, \$34.55; 4½-inch, \$38; 5-inch, \$43.50; 6-inch, \$56. Galvanized, ¼-inch, \$2.85; ¾-inch, \$3.05; ½-inch, \$3.57; ¾-inch, \$4.83; 1-inch, \$6.93; 1¼-inch, \$9.45; 1½-inch, \$11.34; 2-inch, \$15.12.

Lead.—Holding its own at \$4.25. Easier in England.

Lime.—In plentiful supply no very active movement. Price for large lots at kilns outside city 21c. per 100 lbs. f.o.b. cars; Toronto retail price 35c. per 100 lbs. f.o.b. car.

Lumber.—The following are quotations for lumber suitable for making forms for concrete, per 1,000 feet f.o.b., shipping points; hemlock, 2-inch plank, \$16; 2 x 4 scantling, \$12; spruce, good mill culls, 2-inch, \$14. For dressing one or two sides the prices will be about \$1.25 in advance of quoted prices, and for dressing and matching about \$1.75.

Nails.—Wire, \$2.55 base; cut, \$2.70; spikes, \$3.15.

Pitch.—Fair demand at 75c. per 100 lbs.

Pig Iron.—More pig is selling; Summerlee quotes: No. 1, \$25.50; No. 3, in car load lots, \$22 to \$23 here; Glengarnock, \$25.50; Clarence, \$20; No. 1 Cleveland, \$20 to \$22; Old Country market firm.

Steel Rails.—80-lb., \$35 to \$38 per ton. The following are prices per gross ton; Montreal, 12-lb. \$45, 16-lb. \$44, 25 and 30-lb. \$43.

Sheet Steel.—In moderate supply; 10-gauge, \$2.65; 12-gauge, \$2.70.

Tar.—Market unsettled, \$3.50 per barrel the ruling price.

Tank Plate.—3-16-in., \$2.65.

Tin.—Irregular abroad, but higher on the whole; price here 33 to 34c.

Tool Steel.—Jowitt's special pink label, or octagon drill steel, 10½c. per pound; Capital, 12c.; Conqueror, highspeed, 65c. base; Velos, highspeed, 60c. base.

Zinc.—Very little doing, we quote 5½c

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Montreal, April 15th, 1908.

The situation throughout the pig-iron markets of the world is reported to show very little change, this week. There has been further talk of reduction in price in the United States and, although an attempt is being made to maintain prices at their former level, it seems to be the general opinion that purchasers need not pay the prices generally given out.

In England and Scotland the situation seems firmer than in the United States. The higher grades of metal are in fair demand and it is claimed that the tone of the market is firm. Shipments are about to leave for Canada and will arrive here about the opening of navigation.

Locally, a moderate amount of orders is being booked for metal for delivery upon the opening of navigation. This, and the approach of the time mentioned, is occasioning quite a little interest, not only in the metal market, but among dealers in finished and semi-finished products as well. Shipments of all sorts of steel and metal and products thereof will go forward actively as soon as the ice is off the waterways. Demand, however, is much behind what it was a year ago.

Antimony.—The market holds steady and sales are being made at 9½ to 10c. per lb.

Bar Iron and Steel.—Prices continue steady at the recent decline. Business is showing a seasonable improvement. Bar iron, \$1.90 per hundred pounds; best refined horseshoe iron, \$2.15, and forged iron, \$2.05; mild steel, \$2.05; sleigh shoe steel, \$2.05 for 1 x ¾-base; tire steel, \$2.05 for 1 x ¾-base; toe talk steel, \$2.50; machine steel, iron finish, \$2.15.

Boiler Tubes.—The market holds steady, demand being fair, prices are as follows:—2-inch tubes, 8 to 8¼c.; 2½-inch, 11c.; 3-inch, 12 to 12¼c.; 3½-inch, 15 to 15¼c.; 4-inch, 19¼ to 19½c.

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

Cement—Canadian and American.—Canadian cement, \$1.70 to \$1.75 per barrel, in cotton bags, and \$1.95 and \$2.05 in wood, weights in both cases 350 pounds. There are four bags of 87½ pounds each, net, to a barrel, and 10 cents must be added to the above prices for each bag. Bags in good condition are purchased at 10 cents each. Where paper bags are wanted instead of cotton, the charge is 2½ cents for each, or 10 cents per barrel weight. American cement, standard brands, f.o.b. mills, 85c. per 350 pounds; bags extra, 10c. each, and returnable in good condition at 7½c. each.

Cement—English and European.—English cement is steady at \$1.85 to \$1.90 per barrel in jute sacks of 82½ pounds each (including price of sacks) and \$2.20 to \$2.30 in wood, per 350 pounds, gross. Belgian cement is quoted at \$1.70 to \$1.80 per barrel in bags, and \$2.05 to \$2.20 per barrel, in wood.

Copper.—The market is slightly weaker, quotations being now 14 to 14½c. per pound. Demand continues limited.

Iron.—Prices for delivery after the opening of St. Lawrence navigation are approximately as follows:—No. 1 Summerlee, on cars, Montreal, \$20.50 to \$21 per ton; No. 2 selected Summerlee, \$20 to \$20.50; No. 3, soft, \$19.50 to \$20; Cleveland, \$18.50, and No. 3 Clarence, \$18; No. 1 Carron, \$22 to \$22.50; Carron special, \$20.25 to \$20.75; Carron, soft, \$20 to \$20.50. Stocks on spot are light. Clarence No. 1 is quoted at \$20.50 to \$21; Clarence No. 3 at \$19 to \$19.50; Carron No. 1 at \$24.50 to \$25, and Carron, soft, at \$22.50 to \$23, cars, Montreal.

Lead.—Trail lead is quoted weaker, at \$3.90 to \$4 per 100 lbs., ex-store.

Nails.—Demand for nails is improving, but prices are steady at \$2.30 per keg for cut, and \$2.25 for wire, base prices.

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

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

Spikes.—Railway spikes are in better demand, \$2.60 per 100 pounds, base of 5½ x 9-16. Ship spikes are steady at \$3.15 per 100 pounds, base of 5½ x 10 inch and 5½ x 12 inch.

Steel Shafting.—At the present time prices are steady at the list, less 25 per cent. Demand shows an improvement.

Steel Plates.—Demand is good, and the market steady. Quotations are: \$2.55 for 3-16, \$2.40 for ¾, and \$2.30 for ½ and thicker, in smaller lots.

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

Tin.—The market is steady at 33½ to 34c. per pound.

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

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

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Winnipeg, April 13th, 1908.

Bar Iron.—\$2.60 to \$2.70.

Beams and Channels.—\$4 to \$4.50 per 100 up to 15-inch.

Building Paper.—4½ to 7c. per pound.

Bricks.—From \$11 to \$12 per 1,000, three grades.

Cement.—\$3.25 to \$3.50 per barrel.

Roofing Paper.—60 to 67½c. per roll.

Nails.—\$4 to \$4.25 per 100.

Tool Steel.—15 to 20c. per pound.

Lumber.—No. 1 pine, spruce, tamarac, British Columbia fir and cedar—2x4, 2x6, 2x8, 8 to 16 feet, \$27.25; 2x20 up to 32 feet, \$38.

Timber, Rough.—8x8 to 14x16 up to 32 feet, \$34; 6x20, 8x20 up to 32 feet, \$38; dressed, \$37.50 to \$48.25.

Boards.—Common pine, 8 in. to 12 in. wide, \$38 to \$45; siding, No. 2 white pine, 6 in., \$55; cull red or white pine or spruce, 6 in., \$24; No. 1 clear cedar, 6 in., 8 to 16 ft., \$60; Nos. 1 and 2 British Columbia spruce, 6 in., \$55; No. 3, \$45.

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