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CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL OF

PUBLIC • WORKS • TENDERS • ADVANCE • INFORMATION • AND • MUNICIPAL • PROGRESS

EVERY THURSDAY

THIS PAPER REACHES EVERY WEEK THE TOWN AND CITY CLERKS, TOWN AND CITY ENGINEERS, COUNTY CLERKS AND COUNTY ENGINEERS THROUGHOUT CANADA.

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THE CANADIAN CONTRACT RECORD,
PUBLISHED EVERY THURSDAY
As an Intermediate Edition of the "Canadian Architect and Builder."

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At its Convention held in Toronto, Nov. 20 and 21, 1889, the Ontario Association of Architects signified its approval of the CANADIAN CONTRACT RECORD, and pledged its members to use this journal as their medium of communication with contractors with respect to advertisements for Tenders.

The following resolution was unanimously adopted at the First Annual Meeting of the Province of Quebec Association of Architects, held in Montreal, Oct. 10th and 11th, 1890: "Moved by M. Perrault, seconded by A. F. Dunlop, that we the Architects of the Province of Quebec now assembled in Convention being satisfied that the CANADIAN CONTRACT RECORD affords us a direct communication with the Contractors,—Resolved, that we pledge our support to it by using its columns when calling for Tenders."

BARTER AND EXCHANGE.

This department has been opened for the speedy barter and exchange of second-hand plant or material, or small lots of new or second-hand materials by builders and others not regularly engaged in the sale of such articles. Advertisements other than those of the above description will not be inserted.

RATES—12 words and under, 15 cents; each additional word, 1 cent (three figures count one word); on two or more subsequent insertions a discount of 10 per cent. will be allowed. Not more than four insertions of an advertisement can be granted.

Replies to advertisements may be addressed to a box at this office, in which case necessary stamps must be sent for re-mailing replies. Advertisements for this department must be prepaid.

TO DRAUGHTSMEN.—About 1½ quires of Whatman's Drawing Paper for sale (Imperial size), only $3.50 for the lot. Box 151 at this office

To Contractors.

A new edition of the *Canadian Contractors' Hand-Book* is now in press, and will be published before the first of June.

The Hand-Book has undergone thorough revision. Everything not considered to be of the greatest practical value has been eliminated from the new edition, while the size of the work has been increased by the addition of seventy-five pages of entirely new material. This book should be in the hands of every architect, builder and contractor who desires to have readily accessible and properly authenticated information on a wide variety of subjects adapted to his daily requirements.

C. H. MORTIMER, Publisher,
Confederation Life Building, TORONTO.

TO CONTRACTORS.

Tenders will be received at the office of the undersigned until noon on SATURDAY, JUNE 3RD, 1893, for the erection of a residence on Madison Ave., Toronto.

The lowest or any tender will not necessarily be accepted.

HENRY SIMPSON, Architect,
9½ Adelaide St. East, Toronto.

TO CONTRACTORS.

Whole tenders will be received by the undersigned for all works (except heating and lighting) required in the erection and completion of a church for the congregation of the Evangelical Association, Berlin, up till WEDNESDAY, MAY 31ST. Separate tenders will be received up till June 15th for the heating and lighting. Plans and specifications may be seen at the office of the Berlin Gas Co. The lowest or any tender not necessarily received. Contractors will be required to furnish satisfactory evidence of their ability, financial and otherwise, to properly execute the work.

WILLIAM NIEHAUS,
J. C. BREITHAUPT,
JOHN S. ANTHES, Chairman.
HARRY J. POWELL, Architect, Stratford.

NOTICE TO WELL BORERS.

Tenders will be received by registered post addressed to the City Engineer, Toronto, up to 12 o'clock noon of the 29TH MAY for the boring of a Well at the Waterworks Pumping Station wharf and another at Hanlan's Point.

Specifications may be seen and forms of tender obtained on application to the office of the City Engineer, Toronto.

A deposit in the form of a marked cheque, payable to the order of the City Engineer, for the sum of 5 per cent. on the value of the work tendered for under $1,000, and 2½ per cent. on the value of the work tendered for over that amount, must accompany each and every tender, otherwise it will not be entertained.

All tenders must bear the bona fide signatures of the contractor and his sureties (see specifications) or they will be ruled out as informal.

The Committee do not bind themselves to accept the lowest or any tender.

DANIEL LAMB,
Chairman of Committee on Works.
Committee Rooms, Toronto, May 18, 1893.

Notice to Contractors

Tenders will be received by registered post addressed to the City Engineer, Toronto, up to 11 o'clock a.m. on SATURDAY, MAY 27TH, 1893, for the following works:

A SEWER

on Wallace avenue, from McKenzie Crescent, easterly to Grogans line fence.

Specifications may be seen, and forms of tender obtained, on and after Monday, May 22nd, 1893, at the office of the City Engineer.

A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 5 per cent on the value of the material tendered for under $1,000, and 2½ per cent. on the value of the material tendered for over that amount, must accompany each and every tender, otherwise it will not be entertained.

All tenders must bear the bona fide signatures of the contractor and his sureties (see specifications) or they will be ruled out as informal.

The Committee do not bind themselves to accept the lowest or any tender.

DANIEL LAMB,
Chairman of Committee on Works.
Committee Rooms, Toronto, May 17, 1893.

TO CONTRACTORS.

Tenders will be received by the undersigned until 5 o'clock Monday, the 29th instant, for taking down the premises known as No. 32 Wellington Street East, removing all old material and rubbish and excavating the site, in accordance with certain plans which may be seen at our office.

DARLING, SPROATT & PEARSON,
Mail Building.

The lowest or any tender not necessarily accepted.

NOTICE TO CONTRACTORS.

Tenders will be received up to 2 o'clock p.m. of JUNE 5TH for the erection of STONE ABUTMENTS and a STEEL OR IRON BRIDGE and for the purchase and removal of the old wooden bridge over the Etobicoke River on the Lake Shore Road between the Counties of York and Peel. Plans and specifications may be seen at the office of J. McDougall, C.E., County Engineer, Court House, Toronto. Tenders must be addressed to Geo Eakin, Clerk of County of York, Court House, Toronto, endorsed "Tenders for Etobicoke Bridge." The lowest or any tender not necessarily accepted.

J. McDOUGALL, C.E.

NOTICE TO CONTRACTORS.

Sealed tenders, separate or whole, addressed to the undersigned and endorsed "Tenders for High School Building in the Town of Prescott," will be received until SATURDAY NOON, JUNE 3RD. Plans and specifications may be seen at my office, Prescott or at the office of Thos. Hanley, Architect, Belleville.

Ample security will be required from parties tendering. The lowest or any tender not necessarily accepted.

I. D. PURKIS, Chairman.

Prescott, Ont., May 23, 1893.

PORTLAND CEMEMT FOR STEAM JOINTS.—The superintendent of a steam trawling company, of Grimsby, England, relates in an English paper his experience in regard to making steam joints, such as manhole covers, with Portland cement. When employed on a steamboat line between England and the continent he used it for this purpose, and says that it was introduced by the superintendent. It was employed not only for manhole plates, but for ordinary steam and water joints of any description. If the cement is good, a little common soda is mixed with it, and all that is necessary is to covet the joint with it and screw up the bolts. Within thirty minutes' time steam or water may be safely admitted to the pipe. He says he has seen steam raised within from four to six hours after making the joint, and long before that time the cement was set perfectly hard. The cement should show signs of setting within a few minutes after applying, or otherwise it should be rejected and fresh cement applied. This corresponds with the experience of greenhouse men, who, in putting pipes into manifolds, formerly used Portland cement neat, ramming it very tightly in place. The application of the soda to the cement seems to be a novelty.

CONTRACTS OPEN.

MIAMI, MAN.—Mr. S. Cowan is preparing to erect a fine residence.

DUNMORE, MAN.—The erection of a Presbyterian church is contemplated.

GRANBY, QUE.—The Town Council is considering a system of waterworks.

APOHAQUI, N. B.—Mr. George B. Jones, merchant, intends erecting a two-story building.

WEYMOUTH, N. S.—A new academy is to be erected, the work to be completed in two years.

CHATHAM, N. B.—The Government has purchased a site on which to erect a post office and custom house.

SEAFORTH, ONT.—Mr. Thomas Stephens invites tenders until the 1st of June for an addition to the Queen's Hotel.

DESERONTO, ONT.—Plans have been prepared and tenders will be called shortly for the erection of a new public school.

LANARK, ONT.—Mr. W. G. Bates will receive tenders until the 29th inst. for the erection of a methodist church in this village.

WELLAND, ONT.—Mr. Stanton proposes erecting a modern residence at the south east corner of Hellem's avenue and Main street.

ORILLIA, ONT.—Mr. Croker has prepared plans for a brick residence to be erected on Colborne street by Mr. C. E. Fitton, D. L. S.

GUELPH, ONT.—The by-law to raise the sum of $8,000 for building a fire hall and improving the market was defeated by the ratepayers.

SARNIA, ONT.—Mr. H. G. Phillips, architect, has prepared plans for enlarging Mr. Charles Mackenzie's summer residence at Dunneld.

LISTOWEL, ONT.—Messrs. Gillies & Martin have purchased Hay Bros. mill site, on which they purpose erecting new foundry buildings.

BILLINGS BRIDGE, ONT.—A new Methodist parsonage will be erected shortly for Rev. Mr. Elliott, to cost in the neighborhood of $1,800.

BATTLEFORD, N W T.—The by-law has been carried by the ratepayers granting the sum of $2,300 towards erecting a brick school house.

VICTORIA, B. C.—Local architects are invited to submit designs for the erection of new schools, to cost not more than $25,000, to be sent in before the 20th of June.

MONCTON, N. B.—The City Council has appointed a committee to urge upon the Dominion Government the necessity of erecting a new railway station here.

LOUISBURG, C. B.—It is reported that Mr. Van Horne has in contemplation the construction of a line of railway from Point Tupper to Louisburg, a distance of about 90 miles.

TORONTO JUNCTION, ONT.—The High School Board decided to erect the new High School building by day labor, the sureties of the successful tenderers not being satisfactory.

HOLLAND, MAN.—The Farmers' Elevator Company invite tenders until the 30th inst. for siding their elevators with metallic shingles. W. J. Charters is secretary of the company.

QUEBEC, QUE.—Messrs Shearer and Billings, architects of the Public Works Department for the Dominion, recently examined the post-office building here with a view to preparing plans for additions and improvements.

OWEN SOUND, ONT.—The North-American Chemical Mining and Cement Co. has engaged Engineer McDowal to survey the land in the vicinity of Shallow lake, where the company's plant is situated, with a view to draining it.

WINDSOR, ONT.—Several Detroit capitalists have formed a syndicate and purchased several acres of land lying between Russell street and the channel bank. All the present buildings on the site thereof will be removed and ten summer residences erected.

STRATFORD, ONT.—David G. Baxter, architect, is preparing plans for a white brick Sunday

School building for the Methodist church, St. Marys, to cost $7,000, tenders for which will be called shortly, also for a Presbyterian church at Avonbank, to be erected in 1894, cost $5,000. It will be of red brick, with slate roof.

RICHMOND QUE.—A scheme is on foot to dam the St Francis river at the site of the old bridge. The council of the village of Melbourne have agreed to grant $3,000 for the purpose and a by-law is to be submitted to the ratepayers of Richmond authorizing a grant of $5,000. Mr. S. Cleveland, of Coaticook, is at the head of the project.

HAMILTON ONT.—Mr Patterson of the Radial Electric Railway Company expects that the work of construction will be commenced in about two weeks, as the company are only waiting for the charter, which they expect to receive in a few days. The Hospital Committee will advertise for tenders for painting and repairing the city hospital.

VANCOUVER, B. C.—It is proposed to expend $60,000 in improvements to the Court House in this city.—The Hudson's Bay Company will shortly call for tenders for the erection of a new warehouse on Water street. Mr. J. Thomson is manager of the company.—Mr. R. M. Fripp has prepared plans for a fine new boarding house. It will contain about a dozen bed-rooms and be fitted up in first class style.

GALT, ONT.—The Galt & Preston Street Railway Company are busily engaged making the necessary arrangements to commence the construction of their line at an early date. Mr. Jennings, C. E., has had the necessary survey made, and the profile and plans prepared. The road will be operated for a time by steam, but it is probable that eventually electricity will be used. Mr. Thomas Todd is president of the company.

OTTAWA, ONT.—A scheme is on foot to build an electric railway between Deschene Mills and Aylmer, a distance of three miles. Mr. R. H. Conroy, warden of the County of Ottawa, is the principal promoter.—E. F. E. Roy, Secretary Department of Public Works, invites tenders until Monday, 5th June, for the construction of post office fittings at St. Hyacinthe, Que. Plans may be seen at above department in this city and at the office of the Clerk of Works, St. Hyacinthe.

LONDON, ONT.—A subscription list to secure funds for the dredging of the Thames at the Forks is being circulated.—The General Electric Company will erect its power house at the foot of York street, adjoining the river and the G. T. R. tracks. New plans therefor are now being prepared.—The members of St. Matthew's church propose building a new edifice on Quebec street, at the end of Queens avenue.—The City Engineer has issued the following building permits: H. Pope, Albert street, brick addition to residence; Adam Beck, brick engine and boiler house to factory, Albert street, F. A. Fitzgerald, brick addition to Dundas street store.—Mr J D Wilson will erect a handsome brick office on Queen's avenue.

WINNIPEG, MAN.—The members of Westminster church have decided on the erection of a new edifice.—The City Council will shortly advertise for tenders for the supply of hardware, also for the construction of two wells.—In a recent interview Mr. Van Horne stated that it was decided to build a large elevator here this season, as the plans were already prepared.—Plans have been prepared by Mr. C. Burgess for additions to the police station. The cost will be about $4,500.—Hon Robert Watson has gone to Ottawa to endeavor to secure from the Dominion Government a site adjoining the Winnipeg court house, on which the Manitoba Government desires to erect a normal school.—Engineers are surveying for a line of railway to be constructed from Calgary to the Red Deer coal mines.

MONTREAL, QUE.—Messrs. Robin & Sadler, leather belting manufacturers, will build a new belting factory this season.—A sewer is to be constructed on Pine avenue, from St. Denis to Drolet street.—The Road Committee invites tenders until noon to-morrow (Friday) for the supply of curbstone, flagstone, granite, porphyry and scoria blocks, and for the laying of same, also for each kind of asphalt and composition sidewalk required during the present year.—The Park Commissioners will ask the City Council for an appropriation of $5,000 for permanent roads in Mount Royal Park.—The Light Committee has drawn up specifications for inviting tenders for the supply of gas for public lighting, which will be presented to the Council at its next meeting, and if approved, tenders will be asked for at an early date.—Regarding the Chambly enterprise, Hon. J. R. Thibeaudeau has stated that engineers were now preparing plans, which would be ready by the beginning of next week, and as soon as these were ready, tenders for the construction work would be asked for The work will be carried on under the supervision of eminent Canadian and American engineers.—Tenders will be asked in a few days for the construction of the Brock street subway.

TORONTO, ONT.—Mr. Richard McDonell, who endeavored to secure posession of the Parkdale pumping house property as a site for a rolling mill, has decided to erect the building on his own property a short distance west of his residence, near the Sunnyside Orphanage. The contract for grading has been let, and the work will be proceeded with immediately.—A movement has been commenced by the medical men of this city to establish a hospital for the treatment of special cases and where the patients could receive personal attention from their doctor. The cost of erecting and equipping a suitable building would be in the neighborhood of $100,000. The scheme seems to be meeting with approval by the medical profession, and will probably be carried out. Dr. Nattrass is acting secretary.—The City Engineer is of the opinion that the intake pipe should be run further out into the lake, and surveyors are taking soundings for the purpose of preparing an estimate of the cost.—Building permits have been granted as follows: D. Hayes, 2 story bk. store and dwelling, 134-6 Ontario st., cost $2,500, Susan Kennedy, 41 Melbourne ave., det. 2 story and attic bk. dwelling 99-101 Cowan ave., cost $5,000, Robb Jones, Eglinton, alterations to dwelling, 16-20 Alexander st., cost $2,000, John H. King, 105 Grange ave., pr. s. d. 2 story and attic bk. dwellings, n. e. cor. King st. and Wilson ave., cost $2,100, J. Dill, 1 Harbord st., additions to 230-232 Simcoe street., cost $1,300, also 2 story and attic bk. dwelling, 236 Simcoe st., cost $3,200, George Sheard, Gore, Toronto, 3 att. 2 story and attic bk. dwellings, 20 McGill st., cost $9,500.

FIRES.

A large mill at Blenheim, Ont., owned by Mr. J. B. Coates, was completely destroyed by fire on Sunday morning last. The mill was used for the manufacture of staves and hoops, and contained considerable machinery, which was mostly destroyed. The loss will be heavy, being partly covered by an insurance of $5,500. Mr. Coates will rebuild at once.—A three-story brick building on Princess street, Winnipeg, owned by H. S. Holt, railroad contractor, was gutted by fire a few days ago. The upper storey was occupied as a printing establishment, the plant being owned by Miller & Richards, of Toronto. It was worth about $6,000 and insured for $4,000. Anderson & Calvert, agricultural implements, suffered a loss of about $3,000. The printing plants of the Icelandic newspaper and the Manitoban, a monthly magazine, were destroyed. Total loss about $16,000.—The main building of the Breithaupt sole-leather tannery, at Listowel, Ont., has been burned. The engine house and one wing were saved. The loss will be about $30,000.—The residence of Capt. James Mitchell, at Sandy Cove, N. S., has been destroyed by fire.—Mr. James Stark's saw mills at Paisley, Ont., were burned on Saturday morning last. Loss $3,000; insurance, $1,000. Mr. Stark intends to rebuild at once.—The residence of Mrs. Granthani, situated on Mary street, Clinton, Ont., was destroyed by fire a few days ago.—The residence of Mr. Robert Marshall, Camilla, Ont., was burned on the 23rd inst. Insurance $500.—A serious fire occurred a few days ago at Boucherville, Que., about a dozen houses being destroyed.—Fire at Winnipeg, Man., on the 22nd inst., started in Buckle Bros. printing office and caused the following losses. Buckle & Appleton, plant, $10,000 to $15,000; James O'Brien & Co., stock, $4000; N. Bawl, building, $2,000; Anderson & Calvert, stock, $3,000, H. S. Holt building, $15,000 to $17,000; Dr. Henderson, building, $2,500; Heimskringla Printing Co., stock and plant, $4,000 to $5,000.

CONTRACTS AWARDED.

WINNIPEG, MAN.—The tender of Messrs. Doidge & Co. has been accepted by the City Council for the construction of a sewer on River avenue. The contract price is $21,450.

TORONTO, ONT.—The Board of Works has accepted the tender of Mr. A. J. Brown for repairing and relaying the intake pipe at the price of $8,969 Two other tenders were received, the amounts being $13,500 and $11,939.

HUNTINGDON, QUE. The contract for the steel bridge to be erected at Brims, near Athelstan by the municipal council of the county of Huntingdon, has been awarded to A. Rosseau, of the Imperial Bridge and Iron Works, Hochelaga, for the sum of $545.00. The building of the abutments was secured by John Elder, jr. at the sum of $875.94.

KINGSTON, ONT.—The Board of Governors of the Kingston hospital have awarded contracts as follows for the erection of the new woman's building. Masonry, W. McCartney, $7,700, carpentry, Hunter & Harold, $4,735, heating and plumbing, Joseph Jamieson, $3,110, metal work, Nugent & Taylor, $659; painting, J. McMahon, $614. The extras for grates, electric wiring, light fixtures, etc., not included in the contracts, are estimated at $703.

MONTREAL, QUE.—At a recent meeting of the Road Committee, tenders were awarded as follows: James Shearer, white pine boards, tongued and grooved, $16, spruce $19, Jos. Brosseau, yellow pine, $33.90. J. Grier, white pine boards, $13; J. N. B. Grier, tamarac floats, 8¾ cents; Dominion Wire Mfg. Co. wire spikes, $2.91; Chas. Sheppard, bricks, $8.50 and $10.50. Sewers—Chagnon & Co., Beaudry street, $6.23 and $3.80 for rock excavation; Visitation street, $6.15 and $3.80, Montcalm street, $5.95 and $3.80; Cyriac Belhumeur, Champlain street, $5.46 and $3.80; Nap. Laporte, Prince Arthur street, Charuer & Robin, Boyer street, Hefferman & Downey, St. Urbain street; Crescent cement, Morgan & Co., 55½ cents per hundred pounds; drain pipes, Standard Drain Pipe Co.

It is the common practice upon engineering works where large amounts of cement mortar are used, to temper the mortar after it has acquired its initial set. Very frequently a large bed of mortar is mixed in the morning and kept stirred up all day. Contractors and some cement men claim that this does not injure the strength of the cement, and brick masons much prefer this tempered mortar to that freshly made, on account of its greater ease of working. Engineers and inspectors claim that the strength is very much reduced by the process. Sets of experiments were made with a view of determining whether the strength was impaired by the resetting of the cement. Six brands, four Portland and two Rosendale, were selected as representative brands sold upon the market. These cements were bought from retail dealers, and hence are the same quality as those sold to customers. The conclusions must not be considered absolute on account of the small number of cements used. Had a larger number of cements been used, more absolute conclusions could have been reached. In all cases the strength of the cements is decreased by resetting. The Rosendales are affected to a greater extent than the Portland. The former appear to regain their strengths in a faster ratio than the latter.—*Engineering News.*

MUNICIPAL DEPARTMENT.

HOW TO DESIGN A SEWERAGE SYSTEM.

(Concluded.)

It is customary to take gauging and plot the curve, using the Burkli-Zeigler formula, which is

$Q = c\, r \sqrt[4]{A^3 S}$ or McMath's, a later one, which is $Q = c\, r \sqrt[5]{A \cdot S}$

In these formulas Q is quantity of discharge, c is a constant depending upon the nature of the ground, and r is the maximum rate of rainfall. A is area, and S average slope, r is from 2 to 5 inches per hour in this country. It is from 2 to 2½ in Northern New York, and 3½ to 5 inches in the Southern States. C is from 0.20 to 0.75 depending upon the nature of the soil—*i. e.*, whether rural, paved, etc. Many observations for the value of c are badly needed.

We must next proceed to find the size of the sewer in feet and inches, and must for this purpose know the velocity. First find slope and make a profile, and allow a certain minimum velocity that will not allow for deposits. Two feet per second is generally taken as a minimum, but it is too low This is all upon the basis of running full. I never like to use a velocity as small as 2 feet unless it is absolutely unavoidable. Sometimes 3 feet per second costs too much. When the flow is intermittent we really cannot do with a 2-foot velocity, for the deposits cake and pack at night and cannot be removed by the ordinary flow during the next day. Therefore 2 feet for small sizes is really too small. The maximum value of the velocity is only limited by the durability of the material. Having first-class material we can use very steep grades, but even with the best 6 feet per second should not, as a rule, be exceeded. If the sewage contains much grit, even 6 feet will greatly wear the pipes In case of storms it sometimes becomes as high as 12 feet per second.

In considering the hydraulic grades, we should make a distinction between the grades of the ordinary flow and that when the sewer is flowing full. First draw in the hydraulic grade so that it just misses the cellars, etc., or the line to which water is allowed to rise, and plot from this downward. The shapes of the sewers are best circular if small, the material giving the best results being vitrified pipes. The circular shapes are very much cheaper, as the vitrified pipes cannot be easily made and burnt in other shapes. When we build brick sewers it is customary to make them egg-shaped, because it concentrates a small flow into a deep one. Four centered ellipses are used where there is a greater ordinary flow than in the egg shapes. When we are limited in height we can use the horseshoe shape. Some of these forms have a small sub-channel, either in the centre of the bottom or to one side to take the ordinary flow.

We are now ready to determine the sizes. For this purpose we use Kutter's formula, which is the most reliable. Considering that the slope has no effect upon velocity on slopes over 2 feet per mile, Kutter's formula reduces to

$$v = A R \sqrt{S} \div (B + \sqrt{R})$$

A and B are determined by the interior surface of the sewer. For ordinary practice $A = 188$ and $B = 0.64$. R is equal to the mean radius of the section. This formula can be reduced to $y^2 = 2px$ and therefore is parabolic in form. We can thus plot a table graphically, giving all necessary information respecting the size of sewers. Considering y^2 as a square root, we have only to calculate the locus of one point in each parabola, and as it thus reduces to a straight line it can be at once drawn in. The largest sizes of sewers built are from 20 to 22 feet in diameter. In America the smallest sewer allowed is 8 inches, and in England 9 inches. This has been taken as a minimum because it has been found that ordinary pieces of solid matter likely to get into a sewer occasionally will not turn over in a 6-inch sewer, but strike, causing obstruction. This seldom occurs in the 8-inch pipe.

Junctions should be carefully constructed so as to cause no retardation or deposit. They should not form eddies nor cause any diminution in velocity. The best form of intersection is that in which the sewers take their real theoretical form of junction inside. The use of the tongue, in intersections, has been one of the elements of success in remedying foul conditions in modern sewerage systems.

Manholes are for the purpose of inspection and cleaning. Their covers should be perforated with 1 to 1½-inch holes to allow for ventilation. Their distance apart varies with the design; should not be more than from 200 to 500 feet apart on straight lines. Sufficient inlets for the admission of water should be provided at corners of streets, etc. These openings are either catch-basins for retaining the solid matter which would otherwise find its way into the sewer or ordinary openings, called inlets, without any provision of this kind. Flush tanks are very necessary for cleaning and should be placed at every dead end. Their supply may be taken from the city water supply or from carts. For cleaning larger sewers gates are necessary. These are arrangement for closing the sewer temporarily so that it is dammed up, and after a large quantity of water has collected they are opened, and the sudden rush of water flushes the sewer. There is one other point to consider, and that is ventilation. We should first relieve the pressure, and, secondly get rapid change of air Artificial ventilation is not a successful method, and natural methods are the only good ones, therefore see that ample opportunity is left for the ingress and egress of air. Lastly, to make the whole thing plain to the average councilman make your drawings very clear and in colors, and write a report describing the design in detail and giving reasons for all recommendations. The report if required should embody also an estimate of cost.

CARRYING CAPACITY OF SEWER PIPE.

GALLONS PER MINUTE.

Size of pipe.	½ inch fall per 100 ft.	1 inch fall per 100 ft.	2 inch fall per 100 ft.	3 inch fall per 100 ft.	6 inch fall per 100 ft.	9 inch fall per 100 ft.	1 foot fall per 100 ft.	2 feet fall per 100 ft.	3 feet fall per 100 ft.
3 inch.		13	19	23	32	40	46	64	79
4 "		27	38	47	66	81	93	131	163
6 "		75	105	129	183	224	258	364	450
8 "		153	216	265	375	460	529	750	923
9 "		205	290	355	503	617	711	1006	1240
10 "		267	378	463	655	803	926	1310	1613
12 "		422	596	730	1033	1273	1468	2076	2554
15 "		740	1021	1282	1818	2224	2464	3617	4467
18 "		1168	1651	2022	2860	3508	4045	5704	7047
24 "		2396	3387	4152	5871	7202	8303	11744	14466
30 "		4187	5920	7252	10257	12580	14504	20516	25277

When the area to be drained and the fall of the sewer per 100 feet are known, the above table will show the number of gallons per minute the respective sizes of pipes will accommodate.

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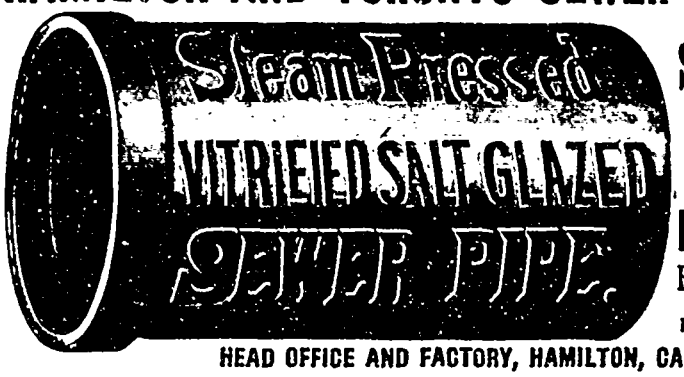

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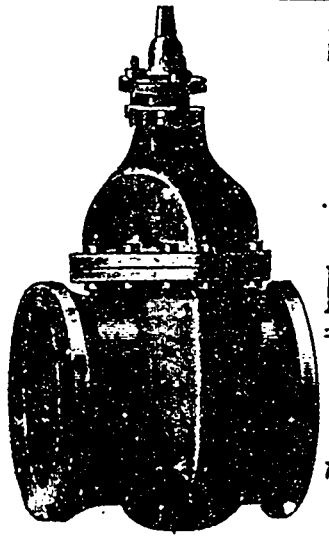

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Prices of Building Materials.

LUMBER.

CAR OR CARGO LOTS.

	Toronto. $	Montreal. $		
1¼ to 2 clear picks. Am ins	34 00@36 00		40 00@45 00	
1¼ to 2 three uppers, Am ins.	37 00		40 00	45 00
1¼ to 2, pickings, Am ins.	27 00		27 00	30 00
5 inch clear			52 50	60 00
1 x 10 and 12 dressing and better	20 00	22 00	18 00	20 00
1 x 10 and 12 mill run	13 00	14 00		10 00
1 x 10 and 12 dressing	14 00	16 00		18 00
1 x 10 and 12 common	12 00	13 00	8 00	10 00
1 x 10 and 12 spruce culls	10 00	11 00	10 00	11 00
1 x 10 and 12 maple culls		9 00		9 00
1 inch clear and picks	28 00	30 00	33 00	35 00
1 inch dressing and better	18 00	20 00	18 00	20 00
1 inch siding, mill run	14 00	16 00	14 00	16 00
1 inch siding, common	11 00	12 00	12 00	14 00
1 inch siding, ship culls	10 00	11 00	10 00	11 00
1 inch siding, mill culls	8 00	9 00	8 00	9 00
Cull scantling	8 00	9 00	8 00	9 00
1¼ and thicker cutting up plank	22 00	25 00	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	15 00	14 00	15 00
1 inch strips, common	11 00	12 00	11 00	12 00
1¼ inch flooring	14 00	15 00	14 00	15 00
1½ inch flooring	14 00	16 00	14 00	16 00
XXX shingles, sawn, per M 16 in.	2 60	2 70	2 60	2 70
XX shingles, sawn	1 60	1 70	1 60	1 70

YARD QUOTATIONS.

Mill cull boards and scantling	10 00		10 00
Shipping cull boards, promiscuous widths	13 00		13 00
Shipping cull boards, stocks	16 00		16 00
Hemlock scantling and joist 2p to 16 ft	11 00	12 00	10 00
Hemlock scantling and joist up to 18 ft	12 00	13 00	12 00 13 00
Hemlock scantling and joist up to 20 ft	13 00	14 00	13 00 14 00
Scantling and joist, up to 16 ft		14 00	14 00
" " 18 ft		15 00	15 00
" " 20 ft		16 00	16 00
" " 22 ft		17 00	17 00
" " 24 ft		19 00	19 00
" " 26 ft		21 00	21 00
" " 28 ft		23 00	23 00
" " 30 ft		25 00	25 00
" " 32 ft		27 00	27 00
" " 34 ft		29 50	29 50
" " 36 ft		31 00	31 00
" " 38 ft		33 00	33 00
" " 44 ft		36 00	36 00

	Toronto.	Montreal.		
Cutting up planks, 1¼ and thicker, dry	25 00	26 00	25 00	26 00
Cutting up planks, 1¼ and thicker, board	18 00	22 00	18 00	22 00
Cedar for block paving, per cord		5 00		5 00
Cedar for Kerbing, 4 x 14, per M		14 00		14 00
	B. M.			
1⅛ in. flooring, dressed, F M	28 00	31 00	28 00	31 00
1⅛ inch flooring, rough, B M	18 00	22 00	18 00	22 00
1¼ " dressed, F M	27 00	30 00	27 00	30 00
1¼ " undressed, B M	18 00	19 00	18 00	19 00
1¼ " dressed	18 00	22 00	18 00	22 00
1¼ " undressed	12 00	15 00	12 00	15 00
Beaded sheeting, dressed	22 00	35 00	22 00	35 00
Clapboarding, dressed		12 00		12 00
XXX sawn shingles, per M 18 in.	2 65	2 75		3 00
Sawn Lath	2 50	2 60	2 50	2 60
Cedar		2 90		2 90
Red oak	30 00	40 00	30 00	40 00
White	35 00	45 00	35 00	45 00
Basswood, No. 1 and 2	18 00	20 00	18 00	20 00
Cherry, No. 1 and 2	70 00	70 00	70 00	80 00
White ash, No. 1 and 2	25 00	25 00	30 00	35 00
Black ash, No. 1 and 2	18 00	30 00	18 00	30 00
Dressing stocks	16 00	22 00	16 00	22 00
Picks, American inspection		40 00		40 00
Three uppers, Am. inspection		50 00		50 00
BRICK—₱ M				
Common Walling		7 50		6 00
Good Facing		9 00		8 50
Sewer	8 50	9 00	8 50	9 00
Pressed Brick, Per M:				
Plain brick, f. o. b. at Milton		16 00		
" " 2nd quality		14 00		
" " 3rd "		8 00		
Hard Building		4 50		
Moulded and Ornamental, per 100	3 00	10 00		
Roof Tiles		24 00		
Diamond locking tile		16 00		
First quality, f.o.b. at Campbellville		18 00		25 00
2nd quality, f.o.b.		14 00		20 00
3rd " "		11 00		17 00
Ornamental, per 100	3 00	10 00	3 00	10 00
Tiles		24 00		26 00
Plain brick, "A" f.o.b, Don Valley		18 00		25 00
" " "B"		16 00		22 00
" " "C"		13 00		18 00
Trojan or Buff		24 00		30 00
Ornamental, per 100	3 00	60 00	3 00	60 00
Plain brick, f.o.b. Port Credit		18 00		
" " 2nd quality		13 00		
" " 3rd "		10 00		
Hard Building		8 00		
Ornamental, per 100	3 00	10 0		
SAND.				
Per Load of 1½ Cubic Yards		1 25		1 25
STONE.				
Common Rubble, per toise, delivered		14 00		14 00
Large flat Rubble, per toise, delivered		18 00		18 00
Foundation Blocks, per c ft.		50		50
Kent Freestone Quarries Moncton, N. B., per cu ft., f.o.b.		1 00		
River John, N. S., brown Freestone, per cu. ft., f.o.b.		95		
Ballochmyle	80	90	65	75
New York Blue Stone				1 05
Granite (Stanstead) Ashlar, 6 in. to 12 in., rise 9 in., per ft.				25
Moat Freestone			70	80
Thomson's Gatelawbridge, cu. ft.			75	80
Credit Valley Rubble, per toise, delivered	13 00	14 00		
Credit Valley Brown Coursing, per superficial yard	2 50	3 00		2 90
Credit Valley Brown Dimension, per cubic foot		90		90
Credit Valley Grey Coursing, per superficial yard	1 50	2 00		2 15
Credit Valley Grey Dimension, per cubic foot		75		80
Madoc Rubble, delivered, per toise	14 00	14 50	14 00	14 50
Madoc dimension floating, f. o. b, Toronto, per cubic ft.	30	32		
Ohio Freestone, No. 1 Blue Promiscuous f.o.b.		60		
No. 1 Blue Dimension		65		
No. 1 Buff Promiscuous		80		
No. 1 Buff Dimension		85		
The above prices means freight and duty paid.				
2 in. sawed flagging per sq. ft		22		
2½ " " " "		23¾		
3½ " " " "		26½		
4½ " " " "		22		
5½ " " " "		27½		
6½ " " " "		33		
Duty to be added to these prices.				
Quebec and Vermont rough granite for building purposes, per c.ft. f.o.b. quarry	33	1 50		
For ornamental work, cu. ft.	35	2 0		
Granite paving blocks, 8 in. to 12 in. x 6 in. x 4½ in., per M		50 00		
Granite curbing stone, 6 in. x 20 in., per lineal foot		70		
SLATE.				
Roofing (₱ square).				
" red		16 00		20 00
" purple		9 00		10 00
" unlading green		8 50		6 00
" black		8 00		7 50
Terra Cotta Tile, per sq.		22 00		
Ornamental Black Slate Roofing		8 00		
PAINTS. (In oil, ₱ lb.				
White lead, Can., per 100 lbs.	6 25	6 50	6 00	6 25
" zinc, Can., " "	6 50	7 50	7 50	8 00
Red lead, Eng.	5½	6½		6
" venetian, per 100 lbs.	1 60	1 75	1 60	1 75
" vermillion	90	1 00	90	1 00
" Indian, Eng.	10	12	10	12
Yellow ochre	5	10	4	6
Yellow chrome	15	20	15	20
Green, chrome	7	12		12
" Paris	25	40		20

	Toronto.	Montreal.		
Black, lamp	15	25	12	25
Blue, ultramarine	15	20	12	18
Oil, linseed, raw, ₱ Imp. gal.	63	68	63	65
" " boiled "	63	72	66	68
" " refined, "	78	85	75	75
Putty	2¾	2¾	2¾	2¾
Whiting, dry, per 100 lbs.	75	1 00	60	75
Paris white, Eng., dry	90	1 25	90	1 10
Litharge, Am.	6½	8	6½	8
Sienna, burnt	15	20	12	15
Umber, "	8½	12	12	15
CEMENT, LIME, etc.				
Cement, Portland, per bbl.		2 50		
" English " "		2 75		
" Belgium " "		3 25		
" Thorold, " "		1 50		
" Queenston, " "		2 25		
" Napanee, " "		1 50		
" Hull, " "		1 50		
" German " "			2 65	2 85
" London " "			2 45	2 90
" Newcastle " "			2 35	2 50
" Belgian " "			2 30	2 40
" Canadian " "			2 25	2 30
" Roman " "			2 75	
" Parian " "			4 50	4 75
" Superfine " "			6 50	7 00
Keene's Coarse "Whites"			4 50	4 75
Calcined plaster, per barrel			1 55	1 70
Fire Bricks, Newcastle, per M			20 00	24 00
" Scotch "			30 00	35 00
Lime, Per Barrel, Grey		40		
" " White		55		
Plaster, Calcined, N. B.		2 00		
" " N. S.		2 00		
Hair, Plasterers', per bag	80	1 00		
HARDWARE.				
Cut nails, 5d & 6d, per keg		2 40		2 25
Steel " " " "		2 50		2 35
CUT NAILS, FENCE AND CUT SPIKES.				
40d, hot cut, per 10 lbs		5		5
30d, " " "		10		10
20d, 16d and 12d, hot cut, per 100 lbs		15		15
10d, hot cut, per 100 lbs		20		20
8d, 9d, " " "		25		25
6d, 7d, " " "		40		40
4d to 5d, " " "		60		60
3d, " " "		1 00		1 00
2d, " " "		1 50		1 50
4d to 5d cold cut, not polished or blued, per 100 lbs		50		50

	Toronto.	Montreal.		
3d to 5d cold cut, not polished or blued, per 100 lbs		90		90
FINE BLUED NAILS.				
3d, per 100 lbs		1 50		1 50
2d, " "		2 00		2 00
CASING AND BOX, FLOORING, SHOOK AND TOBACCO BOX NAILS.				
12d to 30d, per 100 lbs		50		50
10d, " "		60		60
8d and 9d, " "		75		75
6d and 7d, " "		90		90
4d to 5d, " "		1 10		1 10
3d, " "		1 50		1 50
FINISHING NAILS.				
3 inch, per 100 lbs		85		85
2½ to 2¾ " " "		1 00		1 00
2 to 2¼ " " "		1 15		1 15
1½ to 1¾ " " "		1 35		1 35
1¼ " " "		1 75		1 75
1 " " "		2 25		2 25
SLATING NAILS.				
5d, per 100 lbs		85		85
4d, " "		85		85
3d, " "		1 25		1 25
2d, " "		1 75		1 50
COMMON BARREL NAILS.				
1 inch, per 100 lbs		1 50		1 50
⅞ " " "		1 75		75
¾ " " "		2 25		2 25
CLINCH NAILS.				
3 inch, per 100 lbs		85		85
2½ and 2¾ " " "		1 00		1 00
2 and 2¼ " " "		1 25		1 25
1½ and 1¾ " " "		1 35		1 35
1¼ " " "		2 00		2 00
1 " " "		2 50		2 50
SHARP AND FLAT PRESSED NAILS.				
3 inch, per 100 lbs.		1 35		1 35
2½ and 2¾ " " "		1 50		1 50
2 and 2¼ " " "		1 65		1 65
1½ and 1¾ " " "		1 85		1 85
1¼ " " "		2 50		2 50
1 " " "		3 00		3 00
Structural Iron:				
Steel beams, per 100 lbs		2 75		2 50
" channels, "		2 85		2 60
" angles, "		2 50		2 30
" tees, "		2 80		2 65
" plates, "		2 55		2 35
Sheared steel bridge plate		2 25		2 35

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