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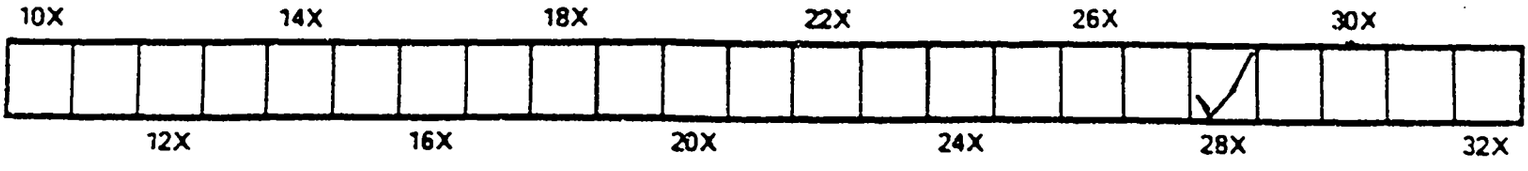

CANADIAN CONTRACT RECORD
A WEEKLY JOURNAL OF
PUBLIC WORKS • TENDERS • ADVANCE INFORMATION • AND MUNICIPAL PROGRESS
EVERY THURSDAY

This paper reaches every week the Town and City Clerks, Town and City Engineers, County Clerks and County Engineers, Purchasers of Municipal Debentures and leading Contractors in all lines throughout Canada.

VOL. 7. NOVEMBER 5, 1896 No. 40.

THE CANADIAN CONTRACT RECORD,

PUBLISHED EVERY THURSDAY

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Information solicited from any part of the Dominion regarding contracts open to tender.

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NOTICE TO PLUMBERS AND STEAMFITTERS

Separate or lump tenders, addressed to the undersigned, will be received through registered post up to noon on

THURSDAY, NOV. 12th, 1896,

for the following trades in connection with the erection of the new city buildings, viz.:—

(1) Plumbing and Gasfitting.
(2) Steam-Heating, etc.
(3) Galvanized Iron Work.
(4) Electric Wiring.

Plans and specifications and form of contract may be seen, and forms of tender and all other information obtained, upon application at the office of E. J. Lennox, architect, corner King and Yonge streets, Toronto, on and after Monday, the 2nd day of November next. Each and every tender must comply with the terms of the specifications and this advertisement, and be accompanied by a marked cheque, made payable to the order of the City Treasurer, Toronto, equal to 2½ per cent. of the amount of tender, which will be forfeited to the city in the event of any person whose tender is accepted failing to execute the necessary contract or give sureties satisfactory to the Board of Control for the due fulfilment of the same. The deposits of unsuccessful tenderers will be returned.

Tender must be on forms supplied by the architect, which provide for the bona fide signatures of the contractor and his sureties, or they will be ruled out as informal. The lowest or any tender not necessarily accepted.

ROBERT J. FLEMING, (Mayor),
Chairman Board of Control.

City Hall, Toronto, Oct. 30, 1896.

TOWN OF PERTH

TENDERS FOR WATERWORKS

The Corporation of the Town of Perth is prepared to grant a franchise for a term of years for the putting in and operating of a

SYSTEM OF WATERWORKS

for the said town. All necessary information can be had by application to the undersigned.

JNO. A. KERR,
Clerk Town of Perth.

Notice to Contractors

CANADIAN CONTRACTOR'S HAND-BOOK

A new and thoroughly revised edition of the *Canadian Contractor's Hand-Book*, consisting of 150 pages of the most carefully selected material, is now ready, and will be sent post-paid to any address in Canada on receipt of price. 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.

Price, $1.50; to subscribers of the CANADIAN ARCHITECT AND BUILDER, $1.00. Address

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

BUSINESS NOTES.

Labelle & Vallee, roofers, Montreal, have dissolved.

H. N. Bernier, plumber, St. Hyacinthe, Que., is announced to have assigned.

Grothe Bros., contractors, Montreal, have made an offer of 25 cents on the dollar.

Martin & Carriere, contractors, St. Louis du Mile End, Que., have dissolved partnership.

CONTRACTS OPEN.

HARTLAND, N. B.—The Foresters have laid the foundation of a large hall.

MAGOG, QUE.—A. G. Dolloff has purchased a site and will commence building operations at once.

SAULT STE. MARIE, ONT.—The town council is being asked to grant a free site for a new post-office.

FENELON FALLS, ONT.—J. W. Howry & Sons are said to have decided to rebuild their saw mill.

WEBBWOOD FALLS, ONT.—A company proposes erecting a large pulp mill on the Spanish river at this point.

PAKENHAM, ONT.—The Presbyterian congregation propose erecting a new church, at a cost of $10,000.

YARMOUTH, N. S.—Henry R. Lordly, C. E., is preparing plans for a system of raising water to the reservoir.

KASLO, B. C.—The by-law to grant a franchise for electric lighting to Alexander & Retallack has been defeated.

RAT PORTAGE, ONT.—The Keewatin Power Company will shortly resume the work of completing their water power here.

REGINA, N. W. T.—The North-West legislature has passed a resolution favoring the immediate construction of the Crow's Nest railway.

MIDWAY, B. C.—F. M. Kerby, C. E., is making surveys of an irrigating ditch to supply Midway townsite and the Murray and Sullivan ranches with water.

UXBRIDGE, ONT.—Mr. Canavan is considering a project to convert two of his stores into a first-class hall, with circular gallery, and seated throughout with opera chairs.

CORNWALL, ONT.—The residence of Hon. John S. McDonald having recently been purchased for a Roman Catholic hospital, the building will be overhauled and fitted up for the purpose.

PORT STANLEY, ONT.—The Port Stanley Elevator Co., with a capital of $3,000, has been organized here. Among the promoters are Joseph De Gurse, civil engineer, of Windsor, and D. M. McKay, of this place

ALMONTE, ONT.—Messrs. Bell & Wilkie have just completed a survey of the route for that part of the Carp, Almonte and Lanark railroad between Carp and Almonte, and have also prepared a map, plan and profile of the same.

WINDSOR, ONT.—Dr. Casgrain, chairman of the water commissioners, states the board will take immediate steps to put in a filtering plant at the present intake. It will cost about $40,000, and the ratepayers will be asked to sanction the work.

LACHUTE, QUE.—The town is asked to grant a bonus of $30,000 to the Great Northern Railway Company, which proposes constructing a railway. Should the

bonus be granted a brick passenger station will be erected. J. G. Scott is secretary of the company.

HINTONBURG, ONT.—James McGee will erect a new residence, at a cost of $2,800.—The by-law to raise $10,000 by debentures has been defeated.

KINGSTON, ONT.—A workshop and gymnasium in connection with the Queen's University will be erected, also a library building, at a cost of $30,000.

DANVILLE, QUE.—The Asbestos and Danville Railway Company will apply to the legislature for power to build an electric railway from Danville to Asbestos.

ST. JOHN, N B.—At a recent meeting of the officers of the city brigades of militia, a committee was appointed to secure information regarding drill sheds, with a view to erecting one in this city

PRESTON, ONT.—A by-law has been passed granting the sum of $10,000 to J. J. Stevens, of Galt, who proposes starting a manufactory here. The by law providing the sum of $5,000 for a market site has been defeated.

VANCOUVER, B. C.—The Board of Trade has been notified by the Hon. L. H. Davies, Minister of Marine, that two hatcheries will be built in this province next spring, one on the Fraser and the other on the Skeena river.

NEW WESTMINSTER, B. C.—Tenders for the erection of the Automatic Canning Co.'s factory are now being received.—It is reported that the A. B. C. Packing Co. intend putting up another cannery on the Fraser river.

HALIFAX, N. S.—Freeman Bros. will erect two new residences on Carlton street.—Proposals are invited by W. L. Brown, city treasurer, until Monday, the 30th inst., for a loan of $22,000, $15,000 being for widening Lockman street and $7,000 for widening Quinpool road.

WINNIPEG, MAN.—Mr. Coste, Chief Engineer of the Public Works Department, Ottawa, recently conferred with Mr. Ruttan, City Engineer, respecting the plans for the proposed lock and dam at St. Andrew's rapids.—The question of establishing an Oddfellow's home at some point in the province is meeting with favorable consideration, and it is probable that a committee will be appointed to carry out the scheme.

LONDON, ONT.—The City Council will be asked to issue $85,000 worth of 3½ per cent. debentures to cover the cost of the Port Stanley railway improvements. —The Board of Works have decided to recommend that Mr. Willis Chipman, of Toronto, be appointed as consulting engineer for the proposed sewerage system.—Geo. Craddock, architect, will receive tenders until Saturday next for erecting four brick houses on Piccadilly street.

NIAGARA FALLS, ONT.—Providing the deputation from this place which waited upon the Ontario cabinet recently is successful, and legislation is passed to grant the commissioners of the Q. V. N. F. park power to sell water power for electricity over the lease held by the Cataract Construction Company, the old horse car line running between this place and Niagara Falls South may probably be transformed into an electric road.

QUEBEC, QUE.—The government engineer has recently visited Lake St. John, and it is learned that the $2,500 voted at the last session for public works in that district is to be principally expended in the construction of a wharf at St. Methode, near the mouth of the Mistassani river, and another at the mouth of the Mistassabi river.—C. A. Parent, hardware merchant, is about to erect a large warehouse on the corner of St. Helene and St. Marguerite streets.

HAMILTON, ONT.—The Railway Committee at Ottawa has made an interim order to allow the Toronto, Hamilton and Buffalo Railway Co. to proceed with the building of the spur line at Desjardins canal, providing a deposit of $20,000 is made.—The Westinghouse Mfg. Co., Ltd., of Hamilton, is applying for a charter of incorporation, for the purpose of manufacturing machinery of all kinds. The capital stock will be $500,000.—W. A. Edwards has taken out a permit for the erection of a two-storey brick dwelling at the corner of Locke and Hannah streets, to cost $1,500.

MONTREAL, QUE.—Mr. J. C. Tache, government engineer, recently visited St. Lambert, and it is stated to be the intention of the government to make the expenditure necessary to put the pier at that place in order.—The medical museum at McGill University is to be remodelled, at a cost of $4,000. Mr. A. T. Taylor has charge of the work.—The Montreal Street Railway Co. will issue additional stock to the amount of $1,000,000, the funds derived from the sale of which will be expended on the Guy street extension, improvements to the power house and adjacent property, and the construction of new cars.—C. St. Jean, architect, has prepared plans for the interior decoration of Ste. Sherest seminary chapel. It is Italian Renaissance style.—W. E. Doran, architect, is preparing plans for three houses to be erected on Centre street for Etienne Robert.—Gamelin & Huot, architects, are preparing plans for two tenements and two stores to be erected at the corner of Greene avenue and St. Antoine streets, for Mr. Demers. Same architect has plans in hand for one house to be erected on St. Andre street for Etienne Robert.—The Northern Electric Railway Company is applying for incorporation with power to build an electric railway from this city to St. Jerome.—A large brewery is to be erected in Maisonneuve, at the corner of Ontario and Jean d'Arc streets, by Messrs. Sarasin & Senecal.

OTTAWA, ONT.—The ratepayers of Ottawa East will be asked to grant the sum of $6,000 for the erection of a new school house.—Excavating has been commenced by J. J. MacCracken, on the north side of Waverley street, for a row of dwellings.—The Minister of Agriculture has completed the plans in connection with the North-West creameries, for which the sum of $15,000 has been placed in the estimates. Steps will be taken at once to erect the necessary buildings.—The council of the D. R. A. met last week to consider plans for proposed permanent buildings at Bisley. It is proposed to erect a structure with all necessary conveniences and fourteen double bedrooms. It was resolved to invite competitive plans from architects.—The necessity of increased accommodation at the Protestant hospital is much felt, and steps will be taken at an early date to overcome the difficulty.—The Phrenoline Medicine Co. has been incorporated in this city. Among the promoters are Alfred Crawley, W. J. Flood and T. A. Shore. It is said *to be the intention of the company to immediately* commence the erection of a factory building.—The by-law to authorize the expenditure of $440,000 on a scheme of main drainage approved by the Provincial Board of Health, was defeated on Tuesday last. It is probable that some steps will be taken by the board to compel the authorities to provide drainage for certain portions of the city.—Mr. H. J. Beemer, President of the Gatineau Railway, states that he cannot undertake to proceed with the Nepean Point bridge until $500,000 in bonuses is guaranteed. On this basis he asks the city to extend for eighteen months the time during which the civic bonuses of $150,000 will be available.

TORONTO, ONT.—A large deputation from the House of Industry board waited upon the Board of Control last week to discuss the question of improving the present building or erecting an addition. Their request was favorably received and some action in the matter will be taken at an early date. The specifications upon which it is proposed to invite tenders for a new fire engine were submitted and approved of. Mr. A. W. Godson waited upon the board and requested that the contract for the street railway pavement on Dovercourt road, from Bloor street northward, be awarded to him, as his tender had been accepted for the work some time ago.—The committee of the Technical School Board appointed at its last meeting to interview the City Council in reference to providing for the erection of a more commodious school building have decided to wait upon the Minister of Education and ask for an appropriation from the Ontario government.—Mr. F. H. Herbert, architect, 9 Toronto street, has invited tenders for the erection of a stone and brick residence on Walmer road for R. C. Clute, Q. C.—Mr. Æmilius Jarvis has purchased the property at No. 34 Prince Arthur avenue and will make considerable improvements. Mr. F. H. Herbert, architect, has the work in hand. —The City Council has given notice of its intention to construct the following pavements: Asphalt roadways—on Carlton street, from Sherbourne to Parliament street, cost $14,800; on Wilcox street, from St. George to Robert street, cost $11,000. Brick roadways—on Davenport road, from Avenue road 636 feet westerly, cost $4,200; on Grange avenue, from Spadina avenue to Esther street, cost $4,270; on Harbord street, from St. George to Bathurst street, cost $21,200. Macadam roadway on Gerrard street, from Yonge to Jarvis street, cost $10,700. Cement concrete sidewalks—on Bloor street, south side, Yonge to Jarvis street, cost $1,800; on Sherbhurne street, east side, from Wilton avenue to Gerrard street, cost $809; on Yonge street, both sides, from Bloor street to Davenport road, cost $5,175.—Building permits have been granted as follows: F. H. Herbert, det. 2 storey and attic bk. dwelling, 9 Lamport ave., cost $3,800; Ed. Simpson, factory, Berkeley st., and det. two-storey and attic bk. dwelling, Admiral rd., cost $5,200.

FIRES.

W. H. Ketcheson's dwelling on Charles street, Belleville, Ont., was totally destroyed by fire on Monday last. Loss $2,500; insurance $2,000.—Paul Demain's house at Stoney Point, Ont., has been burned. Loss $1,000.—At Clinton, Ont., on the 1st inst., fire destroyed M. McLennan's shop and residence, D. Barge's store, dwelling and stable, Mrs. Osborne's dwelling, E. Carter's two stores, and the residences of Mr. Olson and Mrs. Whitehead.—Chapell's hotel at Amherst, N. S., was burned to the ground on the 24th ult.—The residence of Wilson Beatty at Amherst Head, N. S., has been burned. Loss $3,000; partially insured.—The *grist and saw mill at Calumet, Que., was* burned on Tuesday of last week. The mill had lately been purchased by Mr. Wilson.—At Milltown, N. B., on the 25th ult., fire destroyed the store of J. F. Clark. —The residence of John Duffy at Kingston Mills, Ont., has been destroyed by fire. Insurance $600.—Five houses at Notre Dame des Anges, Que., were burned a few days ago. The loss is estimated at $10,000.—The Freelton hotel at Freelton, Ont., owned by F. House, of Burlington, Ont, was burned to the ground a few days ago. The loss is estimated at $2,500.—The Grand Trunk Boat Club's house at Montreal was burned on Tuesday last. Loss $7,000; insurance $4,000.—At Richmond, Que., on the 3rd inst., fire destroyed Caxton Hall, The Guardian printing plant, J. A. Charron's general store, T. H. Hall's harness stock, J. A. Dalton's furniture, the dwellings of

N. Pilotte, Main street, Mrs. Wallace, Mrs. Scott and B. Taylor, College street, and Grand Central Hotel stables. The loss is about $100,000.

CONTRACTS AWARDED.

HALIFAX, N. S.—H. S. Rhind has given a contract to T. J. Keating to erect a residence on Fenwick street.

ST. JOHN, N. B.—Scott, Lawton & Love have been awarded the contract for interior alterations to the Parisian millinery store.

HUNTSVILLE, ONT.—The contract for constructing the proposed water works system has been awarded to Edward Farquhar, of Toronto.

HAMILTON, ONT.—The contract for the construction of a bridge over the Trent Valley canal at Auburn has been awarded by the Dominion government to the Hamilton Bridge Co., of this city.

WINDSOR, ONT. — The trustees of Bruce avenue Baptist church have let a contract to Hardcastle & Wood to enlarge and remodel their church. The cost of the alterations is estimated at $4,000.

OTTAWA, ONT.—F. G. Johnson & Co. are reported to have received the contract for five large residences for Dr. Rogers, to be erected at the corner of Elgin and Copper streets. They will have steam heating and improved plumbing.

QUEBEC, QUE.—The contract for the construction of the foundation for the kiosque at the park has been let to Frs. Parent. Chas. Vezina's tender for the heating of the Parent park kiosk, at $1,000, and Mr. Stephen's tender for the kiosk, at $2,337, have been accepted by the City Council.

MONTREAL, QUE.—Building permits have been granted as follows: One house, three stories, on St. Marc street, for Anastasie Poissant—masonry, L. Gauthier; carpenter and joiner's work, G. Bail; architect, Jos. Sawyer. One house, two stories, 26 x 54 feet, on Magdalen street, for Joseph Walton—contractor, Isaac Collins.—S. Frappier, architect, has let contracts as follows for a house on Hutchison street, Montreal Annex, for P. Brouillette: Masonry, Ouimet & Labelle; carpenter and joiner's work, Soucisse & Brouillette; plastering, Stanislas Rochon, jr.—Perrault & Lesage have let the contract for alterations and reparations of a house on McGill street, for Mde. C. Daubre, of Paris, France, to L. Beaudry. —J. Arthur Cooke, architect, has let contracts as below for eight houses on Columbia avenue, Westmount, for W. F. Borland. Masonry, G. Charette; carpenter and joiner's work, R. Neville, jr.; brick work, St. Aubin & Prudhomme; steel work, Dominion Bridge Co.; plumbing, H. Creed & Son; roofing, Campbell & Gilden, plastering, J. Lefebvre, painting, J. E. Blackwell; other trades not let. Same architect has let contracts for six houses on Western avenue, Westmount, for W. F. Borland, as follows: Masonry, J. Quinlanu; carpenter and joiner's work, M. Desantels; brick work, Gauthier Bros.; steel work, Dominion Bridge Co.; plumbing, H. Creed & Son; plastering, H. Contant; painting, H. O'Brien; other trades not let. Mr. Cooke has also let contracts as follows for two houses on Lansdowne and Sherbrooke streets for Messrs. Bacon & Scott: Masonry, Egan & Stuart; brick, Gauthier Bros; carpenter and joiner's work, Bacon & Scott; steel work, Dominion Bridge Co; plumbing, H. Horton; plastering, Knott & Gardiner; roofing, Campbell & Gilday; other trades not let.

TORONTO, ONT.—The Toronto Fence & Ornamental Iron Works Co. have been awarded the contract by the Board of Control for the iron fence at the Queen's Park, at 68 cents and 78 cents per foot.—At the last meeting of the Board of Control it was recommended that the contract for widening the Queen street subway be awarded to W. S. Grant & Co., for the whole work at $63,375, or $59,335 for all excepting the outh-west corner, and that in the event of their refusal to accept the conditions, the tender of C. S. Boon at $63,300 and $60,560 respectively, be accepted.—The contract for two additional direct electric elevators for the store of the Robert Simpson Co., Ltd., has been given to the Fensom Elevator Works. This makes six Fensom elevators in use in this building.

BIDS.

QUEBEC, QUE.—The following tenders were received for the construction of the St. Charles bridge: For the masonry, piers, etc., ready to receive the iron or steel superstructure—Bilodeau, $9,753; A. Lortie, $9,257; Peters, $10,987; A. Rosseau, $9,100. For the iron or steel superstructure alone—Dominion Bridge Company, $11,800; Carrier, Lainé & Co., $10,650; Rosseau, $6,100; for the entire work completed, Carrier, Lainé & Co., $30,550; Rosseau, $15,200.

BUILDING CISTERNS.

To build a cistern that will give entire satisfaction will require more care and expense than is usually given. But the returns will justify the extra care and expense involved.

The excavation or pit should be made 2½ feet wider than the diameter of the cistern when finished, and one foot deeper. A good size for ordinary homes is 8x14 feet in depth, with the floors slightly hollowed and the sides contracted or narrow near the bottom—somewhat like a jug or egg shaped.

After bringing the bottom or floor of the pit to the proper shape, it should be well rammed, to fill up any cavities or soft places in the earth bottom. Then spread a heavy coat of cement mortar, and continue it a foot or two above on each side all round. When the mortar begins to set, pave the bottom with a course of bricks set on edge, well cemented between joints.

The walls of the cistern are started on this floor, beginning with a course of skewbacks to bring the bottom course level all round. On this course start your wall, with sufficient space to allow an 8 inch wall of brick work all round and far enough away from the side of the pit to permit the brick work to receive a good heavy coat of cement mortar on the outside of the wall and connected with floor all round at the bottom.

An outside coat of cement is of more importance than that on the inside, as its office is to keep all surface water from penetrating.

As fast as the wall is carried up, the space back of the brick work should be carefully filled with damp clay, well rammed down in shallow layers. The walls are to be carried up and again drawn in at the top or narrowed gradually.

Three feet below the surface an arch is sprung over the top, and a neck or opening left to receive the curb. The inside is then plastered with a coat of cement mortar, well trowelled down. The cement should be the best quality of Portland or Rosendale mixed in the proportion of one bushel of cement and two of clean sharp sand, mixed dry and tempered for use as needed. When the walls are all plastered, make a wash with cement and water about the consistency of whitewash, then take a half worn broom and brush the walls with the prepared cement wash, to smooth them down. When the wall has set, go over it again and it will close up the holes and make it practically waterproof.

Every cistern should be provided with a filter, built in the same manner as the cistern, except as to size and thickness of side walls. It need not be over 6 or 7 feet in depth and 4 feet in diameter, and distant from the cistern proper 6 or 8 feet. It should be lined with a 4-inch brick wall, cemented in the same manner as cistern, and provided with a 4 or 5-inch sewer pipe connection leading from the bottom of the filter to the cistern. A few brickbats or coarse gravel can be arranged around the opening to prevent the filtering material from washing into the pipe.

Fill in the bottom with 18 inches of coarse gravel and graded down to fine gravel on top; over this put two feet of coarse charcoal and graded to fine coal on top and well settled and levelled down; over the top of the coal spread a double thickness of burlap sacking and put in close to the walls of the filter; then fill up with a foot of clean washed sand, which is the filter proper.

The top must be arranged to allow it to be examined occasionally and all silt or sediment scraped off of the top and fresh sand added, or a layer of salmon brick

(Concluded on Page 4.)

can be laid on their flat side on top of or in a bed of sand. These can be taken up and renewed as they become foul. If the bricks are dispensed with, the water entering from the conductor should fall on a slab of rock to prevent the sand from being stirred or washed through the coal below.

A cistern built as described will last for ages, and be a source of comfort to the householder.—J. A. Reep, in the Clay Worker.

WIRED GLASS.

Some tests were recently made to determine the fire-resisting qualities of wired glass—glass containing in its texture woven wire netting—an American invention. The information is given in a report to the Philadelphia Fire Underwriters' Association, and the results of the trials showed that glass of this kind is capable of withstanding a high temperature, very much higher, than ordinary glass, without melting or losing its continuity, even when suddenly drenched in a heated state in cold water.

The conclusions drawn from the tests, and given in the reports, are as follows:—

1. Wired glass can safely be used in skylights, and in such situations will withstand a severe fire, and not give way when water is thrown on it. A wooden framing for skylight, covered with tin, all seams lock-jointed and concealed-nailed, is superior in fire-resisting quality to iron framing.

2. Wired glass in wooden sash, covered with tin, all seams lock-jointed and concealed-nailed, can safely be used for windows toward an external exposure.

3. Wired glass can safely be used in fire doors to elevator shafts and stairway towers, where it is necessary to light said shafts.

4. In office buildings, hotels, &c., where it is undesired to have elevator shaft entirely enclosed and dark, wired glass permanently built into a brick or terra-cotta shaft, or arranged in a wood metal-covered frame, can safely be used.

5. Wired-glass plates, securely fastened in standard fire shutters, can safely be used towards an external exposure. In this case the fact that a possible fire in a building, all windows of which are protected by fire shutters, can much more readily be detected from the outside through the wired glass, is of importance.

The capability of the wired glass to withstand a temperature beyond the melting point of glass appears to be attributable to the fact that the network of wire in the glass acts as a good conductor of heat, and thereby prevents the accumulation of sufficient heat to melt the glass; and although it may thereby be softened and rendered pliable, the network of wire prevents the glass from giving way by reason of its own weight when softened by the heat.

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

MUNICIPAL DEPARTMENT

THE IMPORTANCE AND ECONOMY OF PAVEMENT MAINTENANCE.

By S. Whitney, in Engineering Magazine.

No one in these times doubts the great value to the citizen of good street pavements. They contribute more perhaps than any other city improvement to the comfort and convenience of the public. They promote business, and add to the material prosperity of the community. They enhance the value of property; they conduce to good health by making cleanliness and correct sanitation possible. They make an appropriate framing for the beautiful homes, surrounded by flowers and lawns, for which our American cities are noted. In short, they are both a necessity and a luxury of modern city life.

It is not surprising, therefore, that we find the subject of street pavements occupying much of the attention of both citizen and city official. No municipal problem is being more closely studied than that of how to provide our city streets with the best pavements at a reasonable cost. Able engineers are devoting themselves to this problem with the zeal its importance demands. They are studying the merits and demerits of the several kinds of pavement; they are preparing specifications for this work with the care and attention to detail that characterize the best modern practice among civil engineers in other lines of professional work. They are subjecting all the materials used to rigid inspection, in order to exclude everything that is defective, and placing eagle-eyed inspectors on the street to see that every part of the work is done in the best manner. The result is, as might be anticipated, that we are building in this country street pavements that do not suffer by comparison with the best in any country, creditable alike to the public that pays for them and to the city officials to whose supervision their excellence is due.

If the same intelligent and vigilant care were exercised in maintaining these pavements as in constructing them, their life and usefulness would be greatly prolonged, large sums of money would be saved to the tax-payers, and our paved streets would not become, as in too many cases they are, as discreditable to the community as they were creditable when first completed. Dirt and refuse of every kind are allowed to accumulate on their surfaces. The ruthless plumber, the gas-fitter, and the sewer-tapper are allowed to cut into or undermine them at will. When these have accomplished their purpose, they generally throw back the material removed without regard to the condition in which the pavement is left. Unlawful loads are hauled over them, breaking the surface, or making ruts and depressions. The children build bonfires on them. In short, a street pavement seems to have no rights that the public are bound to respect.

It is not surprising that under such treatment the best of pavements come to need extensive repairs. The public and our city officials seem not to have learned the important lesson that, however well street pavements may be built, and however satisfactory they may be when first opened to use, their usefulness and beauty can be maintained and prolonged only by giving them the care that every other engineering structure must admittedly receive.

Even when the greatest care and vigilance are exercised by all parties concerned in their construction, unforeseen defects are almost sure to appear in time, either in the pavement itself or in the various constructions under, or connected with, the pavement proper. Below the pavement is usually a net-work of pipes for various purposes, as well as large and deep-laid sewers. These are frequently not completed long enough before the pavement is placed over the trenches made for them to allow natural settlement of the material with which these trenches are filled, and little or no care is taken to properly compact the filling as it is replaced. It is not unusual to find that, by subsequent settlement of this filling, the pavement structure is left unsupported, and performs the services of a bridge as well as a pavement. As might be expected, the pavement is generally insufficient for this double service, and fails under some unusually heavy load that may be hauled over it. But, aside from such extraneous causes of failure, pavements are subjected to the destructive action of the elements, the casualties of use, and the abrasion of travel. No perfect and indestructible pavement has yet been discovered, nor will there be, for some of the qualities necessary to make a perfect pavement are antagonistic — cannot exist together. Thus one of the essential qualities of a good pavement is that it must afford a good foothold for man and beast. Another is that it must be durable. To afford good foothold, there must be friction between the pavement and the feet of men and horses. There can be no friction without abrasion, and abrasion means destruction sooner or later.

The wear or disintegration and failure of pavements, and the consequent necessity for repairs, are due principally to two causes.

(1) If the material of which the pavement is constructed is subject to natural decay, it will in time be destroyed by this cause alone, regardless of the amount of travel to which it may be subjected.

(2) Whatever may be the natural durability of the materials of which the pavement is made, the action of travel over it will in time wear it out. Its life will be measured by the character and quantity of the travel and the ability of the material to withstand that travel.

The frequency and extent to which pavements require repair differ with the materials used in their construction and the use to which they are subjected. Some pavements, among which may be named those properly built of good granite blocks, will require little repair, even under very heavy travel, for several years. On the other hand, a macadam pavement, however well it may have been constructed, will require constant care and attention, and more or less repair, from the time it is opened to travel. Brick pavement of the best character should need little or no repair for a time after its completion, dependent on the quality of the brick used and the amount of travel it carries. Good asphalt pavement, the material of which is an artificial composition requiring great skill and experience to properly prepare and lay, is quite likely soon to develop weak spots requiring attention, but these should be neither great in extent or expensive to remedy.

The value of any pavement and the cost of maintaining it cannot be correctly judged from the fact that repairs become necessary at a comparatively early period. In the broad sense of the word, maintenance, as applied to pavements, covers:

(1) The cost of keeping the pavement in good repair from the time it is completed until it is so far worn out as to require renewal.

(2) The cost of renewal.

(3) The interest on the sums expended for repairs from the time those expenses are incurred until the renewal of the pavement. The sum of these three items divided by the life in years of the pavement will give the true annual cost of maintenance, and is the standard by which the relative economy of maintenance of the various kinds of pavements may be correctly judged.

It is not the purpose of this paper to consider the economic value of the several kinds of street pavement from this standpoint, but it may be observed that we have as yet few complete and reliable data for the solution of the problem, especially in America, and are left to depend upon estimates more or less speculative. We have, however, enough data to warrant the conclusion that macadam pavements, where subjected to considerable travel, are the most expensive of all pavements to maintain; that granite pavements, while requiring little repairs during the earlier years of their life, cost a relatively large sum for renewal, and cannot therefore be considered economical; that wooden-block pavements, as laid in this country, while short-lived, can be renewed cheaply, and are, therefore, if judged by this standard alone, economical; and that, while asphalt pavements may require slight repairs early in their life, the cost of maintenance for a long period of years will be very moderate, which is due partly to the facts that the pavement has a permanent concrete foundation, and that the asphalt surface can be renewed at a comparatively small cost. Our experience with brick pavements is yet too limited, and the quality of the brick used too variable, to enable us to form a fair estimate of the cost of maintaining them.

(To be Continued.)

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

ENGINEERS

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: There is perhaps a little more activity in builders' supplies, the mild weather permitting of work being advantageously carried on. Building paper is in good demand, and a larger movement is reported in pig lead, galvanized iron, iron pipe, and glass. For the latter some good-sized orders have been booked within the past few days. Paints and oils are being sold freely in the east, but in the north and west there is less activity. Cement is quiet, at $2.35 for Portland.

MONTREAL: In some lines there is a fair movement, among which may be mentioned cut nails, building paper, and heavy metals. Orders are, as a rule, however, for small lots. A better feeling is reported in paints and oils, and the volume of trade is expected to increase before the close of navigation. The receipts of cement last week were 5,450 bbls. English and 3,800 Belgian. Sales are announced of one lot of 3,000 barrels of Belgian, one lot of 1,200, one lot of 250 at $1.80 ex-wharf, and one lot of 500 English at $1.95. The tone of the market is firm in sympathy with strong advices from abroad, and higher prices are looked for after the close of navigation.

LUMBER.

CAR OR CARGO LOTS.

	Toronto.		Montreal.	
	$	$	$	$
1¼ to 2 clear picks. Am ins	33 00@36 00		40 00@45 00	
¼ to 2 three uppers, Am ins.	37 00		40 00	45 00
1¼ to 2, pickings, Am ins	26 00		27 00	30 00
inch clear			40 00	45 00
1 x 10 and 12 dressing and 1 better	20 00	22 00	18 00	20
1 x 10 and 12 mill run	16 00	17 00		19
1 x 10 and 12 dressing	20 00	22 00		18 00
1 x 10 and 12 common	13 00	14 00	8 00	10 00
Spruce culls	10 00	11 00	8 00	10 00
1 x 10 and 12 culls	9 00	10 00		9 00
1 inch clear and picks	28 00	3200	35 00	40 00
1 inch dressing and better	20 00	22 00	18 00	20 00
1 inch siding, mill run	14 00	15 00	12 00	16 00
1 inch siding, common	12 00	13 00	10 00	13 00
1 inch siding, ship culls	11 00	12 00	10 00	11 00
1 inch siding, mill culls	9 00	10 00	8 00	9 00
Cull scantling	8 00	9 00	8 00	9 00
1¼ and thicker cutting up plank	24 00	26 00	22 00	25 00
1 inch strips, 4 in to 8 in. mill run	14 00	15 00	14 00	15 00
inch strips, common	11 00	12 00	10 00	12 00
1¼ inch flooring	16 00	17 00	12 00	15 00
1½ inch flooring	16 00	17 00	12 00	15 00
XXX shingles, sawn, per M 16 in	2 25	2 30	2 60	2 60
XX shingles, sawn	1 40	1 50	1 60	1 70
Lath	1 65			1 50
VALD QUOTATIONS.				
Mill cull boards and scantling		10 00	10 00	12 00
Shipping cull boards, promiscuous widths		13 00		13 00
Shipping cull boards, stocks		16 00		16 00
Hemlock scantling and joist up 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
Cedar for block paving, per cord		5 00		5 00
Cedar for kerbing, 4 x 14, per M		14 00		14 00
Scantling and joist, up to 16 ft		14 00		14 00
" " 18 ft		15 00		16 00
" " 20 ft		16 00		16 00
Scantling and joist, up to 22 ft		17 00		17 00
" " 24 ft		19 00		19 00
" " 26 ft		20 00		21 00
" " 28 ft		22 00		23 00
" " 30 ft		24 00		25 00
" " 32 ft		27 00		27 00
" " 34		29 50		29 50
" " 36 ft		31 00		31 00
" " 38 ft		33 00		33 00
" " 44 ft		34 00		36 00
Cutting up planks, 1¼ and thicker, dry	25 00	28 00	25 00	30 00
	B. M.			
1 in. flooring, dressed, F M.	26 00	30 00	28 00	31 00
1 inch flooring, rough, B M.	18 00	22 00	18 00	22 00
1 " dressed, F M.	25 00	28 00	27 00	30 00
1 " undressed, B M.	18 00	19 00	18 00	19 00
1 " dressed	18 00	20 00	18 00	22 00
1 " undressed	12 00	15 00	12 00	15 00
Beaded sheeting, dressed	20 00	35 00	22 00	35 00
Clapboarding, dressed		12.00	8 00	12 00
XXX sawn shingles, per M 18 in	2 60	2 70		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	37 00	45 00	35 00	55 00
Basswood, No. 1 and 2	28 00	30 00	18 00	20 00
Cherry, No. 1 and 2	70 00	90 00	70 00	80 00
White ash. No. 1 and 2	24 00	35 00	30 00	35 00
Black Ash, No. 1 and 2	20 00	30 00	18 00	30 00
Dressing stocks	16 00	22 00	16 00	22 00
Picks, American inspection		30 00		40 00
Three uppers, Am. inspection		50 00		50 00

	Toronto.		Montreal.	
BRICK— ₩ M				
Common Walling		6 50		6 00
Good Facing		8 00		8 50
Sewer	8 50	8 00	8 50	9 00
Pressed Brick, Per M:				
Red, No. 1, f.o.b. Beamsville		15 00		
" " 2		13 00		
" " 3		9 00		
Buff		21 00		
Brown		24 00		
Roman Red		30 00		
" Buff		35 00		
" Brown		40 00		
Sewer		7 50		
Hard Building		6 00		
Roof Tiles		22 00		
Ridge Tile (each)		20		
Ridge Tile "		60		
1st quality, f.o.b. at Port Credit		12 00		18 00
2nd " " " "		10 00		15 00
3rd " " " "		8 00		12 00
Hard building brick		6 50		
Ornamental, per 1000	7 00	10 00		
SAND.				
Per Load of 1½ Cubic Yards		1 25		1 25
STONE.				
Common Rubble, per toise, delivered		10 00		11 00
Large flat Rubble, per toise, delivered		14 00		18 00
Foundation Blocks, per c. ft.		30		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			60	70
Thomson's Gatelawbridge, cu. ft.			75	80
Credit Valley Rubble, per car of 15 tons, at quarry		7 00		
Credit Valley Brown Coursing, up to 10 inch, per sup. yard, at quarry	1 50	1 75	1 50	1 75
Credit Valley Brown Dimension, per cu. ft. at quarry		60		60
Credit Valley Grey Coursing, per super. yard, at quarry		1 00		1 00
Credit Valley Grey Dimension, per cu. ft., at quarry		45		45
Clark's N. B. Brown Stone, per cubic foot, f.o.b.		1 15		1 00
Brown Free Stone, Woodpoint, Sackville, N.B., per cub. ft.		1 15		1 00
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		
Cape Bauld, N. B., Brown Freestone		90		70
Cocaigne, N. B., Gray Freestone (ol.ve-green)		90		70
OHIO FREESTONE, FROM THE GRAFTON STONE CO.'S QUARRIES.				
No. 1 Buff Promiscuous		90		1 00
No. 1 Buff Dimension		95		1 05
No. 1 Blue Promiscuous		60		70
No. 1 Blue Dimension		65		75
Sawed Ashlar, No. 1 Buff, any thickness, per cub. ft.		1 10		1 20
Sawed Ashlar, No. 1 Blue, any thickness, per cub. ft.		80		90
Sawed Flagging, per sq. ft., for each inch in thickness		06½		07½
Above prices cover cost freight and duty paid. For small lots add 5 to 10 cents per cubic foot.				
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		18 00		20 00
" purple		00		10 00
" unfading green		9 00		6 00
" black		8 00		5 50
Terra Cotta Tile, per sq.		25 00		
Ornamental Black Slate Roofing		8 50		
PAINTS. *(In oil,* ₩ *lb.*				
White lead, Can., per 100 lbs.	5 25	5 50	5 50	6 00
" zinc, Can., " "	6 50	7 50	6 50	7 50
Red lead, Eng	4 00	5 00	4 50	5 00
" 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	3	5
Yellow chrome	15	20	15	20
Green, chrome	7	12	7	12
" Paris	20	25	14	20
Black lamp	15	25	12	25
Blue, ultramarine	15	20	12	18
Oil, linseed, raw, by bbl. ₩ *Imp. gal*	48	48	58	59
Oil, linseed, b'l'd, by bbl., ₩ *Imp. gal*	51	51	62	63
Oil, linseed, refined, ₩ *Imp. gal*	78	85	75	75
(Less than bbl., 5c. per gal. advance.)				
Putty	2¾	2¾	2¾	2¾
Whiting, dry, per 100 lbs	60	80	60	75
Paris white, Eng., dry	90	1 25	90	1 00
Litharge Eng	4	5	4 50	5 00
Sienna, burnt	10	15	12	15
Umber, "	8¾	12	12	15
Turpentine	43			

	Toronto.		Montreal.	
CEMENT, LIME, etc.				
Portland Cements.—				
German, per bbl		3 50	2 55	2 60
London	2 75	3 00	1 92	2 05
Newcastle "		2 75	1 85	1 95
Belgian, Joss n. artificial	2 65	2 75	2 65	2 75
English, artifical, per bbl	2 85	3 15	2 55	2 65
Belgian, natural, per bbl	2 55	2 65	1 70	1 85
Canadian "	2 55	2 75	1 80	1 85
Roman "			2 00	2 25
Parian "	4 75	5 00	5 50	5 75
Superfine "	6 75	7 25	8 00	9 00
Hydraulic Cements.—				
Thorold, per bbl		1 75	1 25	30
Queenston, "		1 75	1 50	1 60
Napanee, "		1 75		1 50
Hull, "		1 75		1 50
Ontario, "		1 50		
Keene's Coarse "Whites"	4 50	4 75	4 50	4 75
Fire Bricks, Newcastle, per M	27 00	35 00	15 00	21 00
" Scotch "	27 00	35 00	19 00	21 00
Lime, Per Barrel, Grey		40		
" " White		50		
Plaster, Calcined, N. B		2 00		
" " N. S		2 00		2 50
Hair, Plasterers', per bag	80	1 00		
HARDWARE.				
Cut nails, 50d & 60d, per keg		2 75		2 75
Steel " " " "		2 85		2 85
CUT NAILS, FENCE AND CUT SPIKES.				
40d, hot cut, per 10 lbs		2 80		2 80
30d, " " "		2 85		2 85
20d, 16d and 12d, hot cut, per 100 lbs		2 90		2 90
10d, hot cut, per 100 lbs		2 95		2 95
8d, 9d, " " "		3 00		3 00
6d, 7d, " " "		3 15		3 15
4d to 5d, " " "		3 35		3 35
3d, " " "		3 75		3 75
2d, " " "		4 25		4 25
4d to 5d cold cut, not polished or blued, per 100 lbs		3 25		3 25
3d to 5d cold cut, not polished or blued, per 100 lbs		3 65		3 65
FINE BLUED NAILS.				
3d, per 100 lbs		4 25		4 25
2d, " "		4 75		4 75
CASING AND BOX, FLOORING, SHOOK AND TOBACCO BOX NAILS.				
12d to 30d, per 100 lbs		3 25		3 25
10d, " "		3 35		3 25
8d and 9d, " "		3 50		3 50
6d and 7d, " "		3 65		3 65
4d to 5d, " "		3 85		3 85
3d, " "		4 25		4 25
FINISHING NAILS.				
3 inch, per 100 lbs		3 60		3 60
2½ to 2¾ " " "		3 75		3 75
2 to 2¾ " " "		3 90		3 50
1½ to 1¾ " " "		4 10		4 10
1¼ " " "		4 50		4 50
1 " " "		5 00		5 00
SLATING NAILS.				
5d, per 100 lbs		3 60		3 60
4d, " "		3 60		3 60
3d, " "		4 00		4 00
2d, " "		4 50		4 50
COMMON BARREL NAILS.				
1 inch, per 100 lbs		4 25		4 25
¾ " " "		4 50		4 50
¼ " " "		5 00		5 00
CLINCH NAILS.				
3 inch, per 100 lbs		3 60		3 60
2½ and 2¾ " " "		3 75		3 75
2 and 2¼ " " "		3 90		3 90
1½ and 1¾ " "		4 10		4 10
1¼ " "		4 75		4 75
1 " "		5 25		5 25
SHARP AND FLAT PRESSED NAILS.				
3 inch, per 100 lbs		4 10		4 10
2½ and 2¾ " " "		4 75		4 25
2 and 2¼ " " "		4 40		4 40
1½ and 1¾ " " "		4 60		4 60
1¼ " " "		5 25		5 25
1 " " "		5 75		5 75
STEEL WIRE NAILS.				

Steel Wire Nails, 70c. and 12½% discount from printed list.

Iron Pipe:

Iron pipe, ¼ inch, per foot	6c.	6c
" " ⅜ " "	7	7
" " ½ " "	8½	8½
" " ¾ " "	12	12
" " 1 " "	17	17
" " 1¼ " "	24	24
" " 1½ " "	30	30
" " 2 " "	43	43

Toronto, 65 per cent. discount.
Montreal, 60 to 65 per cent. discount.

Lead Pipe:

Lead pipe, per lb	7c.
Waste pipe, per lb	7½

Discount, 30 % off in small lots.

Galvanized Iron:

Adam's—Mar's Best and Queen's Head:		
16 to 24 guage, per lb	4½c.	4¾c.
26 guage, "	4¾	5
28 " "	5	5¼
Gordon Crown—		
16 to 24 guage, per lb	4½	4½
26 guage, "	4½	4¾
28 " "	4¾	5

Note.—Cheaper grades about ¼c. per lb. less.

Structural Iron:

Steel Beams, per 100 lbs	2 75	2 50
" channels, "	2 85	2 60
" angles, "	2 50	2 3
" tees, "	2 80	2 60
" plates, "	2 55	2 35
Sheared steel bridge plate		2 30

(Corrected up to November 4th)