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CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL

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.

JULY 9, 1896

No. 23.

THE CANADIAN CONTRACT RECORD,

PUBLISHED EVERY THURSDAY

As an Intermediate Edition of the "Canadian Architect and Builder."

Subscription price of "Canadian Architect and Builder" (including "Canadian Contract Record"), \$2 per annum, payable in advance.

C. H. MORTIMER, Publisher,

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

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GRANOLITHIC SIDEWALK

Sealed Tenders, addressed to the undersigned, for Granolithic Pavement in Court House Grounds, Walkerton, in all about 2,100 square feet, will be received at the office of the Clerk of the County, up to

12 a. m. Friday, July 31st.

Plans and specifications may be obtained at the office of County Clerk on and after July, 12th inst.

Each tender to be accompanied by a marked cheque payable to the order of County Treasurer for the sum called for in the form of tender supplied, which will be subject to usual terms of forfeiture for non-completion of contract.

W. S. GOULD,
County Clerk.

Walkerton, June 29th, 1896.

CONTRACTS OPEN.

AYLMER, QUE.—The Klock Lumber Co. will rebuild their saw mill.

FORT WILLIAM, ONT.—W. Edwards proposes erecting a new residence.

THOROLD, ONT.—A system of waterworks will probably be constructed.

WELLANDPORT, ONT.—Brantford capitalists propose erecting a grist mill here.

CREEMORE, ONT.—The construction of a system of waterworks is under consideration.

PRESCOTT, ONT.—A by-law will be voted on to expend \$5,000 for improving the town hall.

DESERONTO, ONT.—It is probable a waterworks system will be constructed for the town, at a cost of \$35,000.

COMBER, ONT.—J. R. Palmer will build an addition to his block on Queen street, 15 feet wide and two storeys high.

AVONMORE, ONT.—O. Fulton and John McLaughlin have interviewed the County Council agitating the erection of a High School here.

ST. DAVID, N. B.—Tenders will be received by Frank Morrison until the 15th inst. for the erection of a steeple for the Union church of St. David.

LONDON, ONT.—Tenders are being received for the erection of additions to Rectory street and Wortley road public schools. Herbert Matthews, architect.

CORNWALL, ONT.—Mr. Campbell has given notice in the County Council of a by-law to provide \$4,000 for the erection of an addition to the Cornwall High School.

PARRSBORO, N. S.—Tenders for erecting the superstructure of a Methodist church are invited until to-day (Thursday) at 7 p. m. R. W. Hodgson, secretary building committee.

VANLEEK HILL, ONT.—A large addition to St. Mary's convent is being constructed. It will be brick, three storeys, 56x45 ft., and will contain class rooms, dormitories, a chapel and large recreation room.

QUEBEC, QUE.—Building permits have been granted as follows: Repairs of a house on Crown street for Mde E. Picard. Contractor, Mr. Sharpe, alterations to warehouse on Dalhousie street for D. E. Drolet.

EDMONTON, N. W. T.—The necessary capital has been subscribed to enable the directors of the Edmonton District railway to proceed with construction. A new school house will be erected to replace St. Joachim school.

SPARROW LAKE, ONT.—A company has been formed here to carry on a summer resort, including the erection of a summer hotel. Among those interested are W. E. H. Massey and Dr. N. A. Powell, of Toronto.

ST. ANDREWS, N. B.—Tenders are asked until the 20th inst., for laying a pipe

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

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TENDERS WANTED

FOR

Whissel Creek Drainage in the Townships of Finch and Cambridge.

Sealed Tenders endorsed "Tenders for Drainage," and addressed to J. A. Cockburn, Crysler, Ont., will be received up to the hour of 10 o'clock a. m. on THURSDAY, THE 23RD DAY OF JULY

Estimated cost of earth excavations in Township of Cambridge, \$2,379.29; estimated cost of culverts in Township of Cambridge, \$215.00; estimated cost of earth excavation in Township of Finch, \$2,695.70; estimated cost of culverts in Township of Finch, \$130.00

The work will be let in two contracts: 1st, the work in the Township of Cambridge; and, the work in the Township of Finch.

Plans, profiles, specifications and instructions to bidders can be seen at the office of J. A. Cockburn, Township Clerk, Crysler, or at the office of I. H. Wiggins, Engineer, at Cornwall, after the 13th day of July, 1896.

The lowest or any tender not necessarily accepted.

F. D. McNAUGHTON, Reeve, South Finch P. O.
J. A. COCKBURN, Clerk, Crysler, P. O.

Crysler, 2nd July, 1896.

TENDERS

DEBENTURES--\$13,500--DEBENTURES

CITY OF FREDERICTON, N. B.

Sealed Tenders will be received for THIRTEEN THOUSAND FIVE HUNDRED DOLLARS CITY OF FREDERICTON DEBENTURES as follows:

\$7,000.00 FREDERICTON SCHOOL DEBENTURES, 4 per cent., payable THIRTY years from the date of issue.

\$2,500.00 FREDERICTON WATER DEBENTURES, 4 per cent., payable THIRTY years from the date of issue.

\$4,000.00 FREDERICTON DEBT DEBENTURES, 5 per cent., payable ELEVEN years from the date of issue.

The above tenders will be received at the City Treasurer's office, Fredericton, up to WEDNESDAY, the 15th DAY OF JULY NEXT. The highest or any tender not necessarily accepted.

Information bearing on the issue will be furnished on application to Chas. W. Beckwith, City Clerk. Tenders must be addressed to John Moore, Esq., City Treasurer, Fredericton, N. B.

JOHN MOORE,
City Treasurer.

Fredericton, N. B., June 26th, 1896.

NOTICE TO CONTRACTORS

Tenders for Brick Pavement and Concrete Sidewalk

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Ont., up to 5 o'clock p. m. on WEDNESDAY, JULY 15, 1896, for the construction of a

Brick Pavement in St. Lawrence Market and Concrete Sidewalk on Carlton Street.

Specifications may be seen and forms of tender obtained at the office of the City Engineer, Toronto, on and after Wednesday, July 8th, 1896.

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 work tendered for up to \$1,000, and 2½ per cent. on the value of the work tendered for over that amount, must accompany each and every tender, otherwise they will not be entertained.

Tenders must bear the bona fide signatures of the contractor and his sureties, or they will be ruled out as informal.

Lowest or any tender not necessarily accepted.

R. J. FLEMING, Mayor,
Chairman Board of Control.

Toronto, July 2, 1896.

drain 700 feet in length. Tenders will include all necessary excavation and the furnishing and laying of pipes. Address N. G. D. Parker or John Rus. ell.

EXETER, ONT.—S. Gidley & Son have purchased Drew's opera house block and will convert the two stores on the ground floor into one and put in plate glass windows. The opera house will also be improved.

HAMILTON, ONT.—The corner stone of the new Emerald street Methodist church was laid on Tuesday last.—A building permit has been granted to W. P. Wuton, for brick residence on Hess street, for Fred. Carpenter, to cost \$2,000.

TILBURY, ONT.—Many of the buildings recently burned are being replaced by improved structures. Mr. Kelly will erect a three storey building and Mr. Thomas Anderson will build a large block, the upper portion of which will be used for an opera house.

GODERICH, ONT.—The council will submit by-laws to the electors on the 15th inst. to raise the following sums. \$12,000 for a stand pipe and pipe extension into the lake; \$6,500 for an incandescent electric lighting system; \$20,000 for the construction of permanent sewers.

ST. CATHARINES, ONT.—The St. Catharines & Niagara Central Railway Company will apply to parliament for authority to issue bonds to be applied in repairing and equipping its line, and to extend the road to connect with the Toronto, Hamilton and Buffalo railway near Smithville.

COBOURG, ONT.—The building of the Cobourg, Northumberland and Pacific railway has been commenced. The road, which must be completed within two years, will extend from Cobourg to a point on the Canadian Pacific railway called Springbrook, twelve miles north-east of Campbellford.

VANCOUVER, B. C.—The B. C. Iron Works Co. propose expending \$100,000 on a marine railway and \$125,000 on the extension of the present works for the manufacture of mining machinery.—J. Findlay & Co. announce that they propose establishing a plant for the manufacture of mining machinery.

VICTORIA, B. C.—The British Pacific Railway Co. will seek incorporation, with power to build a line of railway from this city to Winnipeg, via Butte Inlet, Cariboo, Edmonton and Prince Albert.—The City Council have decided to build a pile bridge across the Victoria arm at Point Ellice, and has appropriated the sum of \$5,200 for the purpose.

NORTH SYDNEY, N. S.—Tenders will be received by J. N. Armstrong, town clerk, until the 10th inst. for supplying the town with hydrants, valves and boxes. Specifications may be seen at the town clerk's office.—The town clerk will receive proposals until the 20th inst. for the purchase of \$50,000 of debentures issued for the purpose of providing the town with a system of waterworks.

HALIFAX, N. S.—A local architect has prepared plans for a brick and stone building to be erected at Campbelltown, N. B., for the Bank of Nova Scotia, tenders for which will be called at once. The same architect is preparing plans for a brick and stone school building, to contain ten class rooms and a large assembly room and fitted with all modern improvements. He is also preparing plans for a store 40x100 ft., to be built at Campbellton, for Jas. Alexander, for a residence at Fredericton, and for remodelling a dwelling at Sydney.

OTTAWA, ONT.—The notice calling for tenders for a railway bridge at Auburn is for the superstructure of the bridge only.—At the first annual meeting of the Hull Electric Railway Co., held on the 2nd

ult., arrangements were made for building loop lines and erecting a large summer hotel at Hull. Mr. Alexander Fraser was elected president and Mr. H. D. Spencer managing director.—The Central Canada Exhibition Association have requested the council to provide better fire protection. The city engineer estimates that 1,400 feet of 5 inch pipe and 3 hydrants are required, at an estimated cost of \$1,200.40. The work has been recommended.

MONTREAL, QUE.—Tenders are being invited for the construction of the Chambly aqueduct. Plans at the office of Mr. Ducharme, director, Banque Jacques Cartier.—George Cook, secretary treasurer of the town of Outremont, will receive proposals until the 10th inst. for the purchase of \$50,000 bonds, payable in 42 years and bearing interest at 4 per cent.—It is reported that surveyors are locating the route of the Montreal, Vaudreuil & Ottawa Railway between Rigaud and Caledonia Springs, and that construction will be commenced during the present month.—A building permit has been granted for 2 houses on St. Denis street for A. Duperrault. Estimated cost \$5,000.—Gamelin & Huot, architects, are preparing plans for a house to be erected at Westmount for Leon Dutil.

TORONTO, ONT.—The Norway school trustees have applied to the York township council for power to issue debentures amounting to \$4,000 for erecting a new school building at Norway.—Alderman Gowanlock has moved in the City Council that the Board of Control be authorized to proceed with the construction of a trunk sewer, according to plans prepared by the City Engineer, and that a by-law be submitted to raise \$1,000,000 for the purpose. The motion was referred to the Board of Works for consideration.—The Board of Control have recommended that the council proceed with the widening of the Queen street subway.—Plans are being prepared for the rebuilding of McKendry & Co.'s store, 202-208 Yonge street. It will be considerably improved and enlarged.—Wm. Lane, reeve of the townships of Denbigh, Abbinger and Asby, has requested aid from the Ontario government in the rebuilding of a number of bridges which have been destroyed by spring freshets and forest fires.—It is stated that the Matthews Art Wood-Work Co. propose establishing a factory in this city.—A sufficiently signed petition is said to have been presented against the construction of a brick pavement on Wellesley place.—The City Engineer has reported that it would cost \$1,200 to extend the Fort Rouille sewer 100 feet into the lake. The recommendation has been referred to the Board of Works.—Dewart & Raney, solicitors, have given notice that application will be made to the Dominion parliament for an act to incorporate the Toronto Radial Railway Co., with power to take over the franchise of the Toronto Belt Line Railway Co., and to convert the present belt line railway into an electric road.—The Canadian Electric Railway & Power Co. is seeking incorporation, with power to build an electric railway from Cobourg to Niagara Falls, via Port Hope, Bowmanville, Oshawa, Whitby, Toronto, Oakville and Hamilton.—The chief of the fire brigade has recommended the purchase of the following supplies: 3,250 feet 2½ inch hose and couplings, \$3,650; 500 feet 3 inch ditto, \$650; 2 two horse hose wagons, \$500; cut-outs for fire alarm boxes, \$2,300; keyless doors for 17 fire alarm boxes, \$213. The request has been sent to the Board of Control.—A site will be granted by the Council to the Dominion Cold Storage Company, which proposes erecting a large five-storey building on a lot adjoining the drill shed.—At a meeting of the Separate School Board held on Tuesday last, plans

and specifications were accepted for a new four-roomed brick school to be erected on Bathurst street, near Bloor. The new building will cost \$4,000.—An English syndicate is considering the question of leasing the Metropolitan Street Railway. The matter of the extension of the line to Richmond Hill is understood to be a part of the deal.—Building permits have been granted as follows: A. Nelson, pr. s.d. two story and attic bk. dwellings, s.w. cor. Spadina rd. and Lowther ave., cost \$10,000; Chas. Page, to rebuild stores 202 Yonge st., cost \$8,000; Samuel S. Clark, det. 2 storey and attic bk. dwelling, 27 Triller ave., cost \$2,300.

FIRES.

The residence of Dr. Wild at Bronte, Ont., was destroyed by fire on Friday of last week.—Fire at Union, B. C., on the 6th inst. destroyed the Williams block on 3rd street, three houses owned by Leon and F. W. Williams, and a cottage owned by A. D. Williams. The loss is about \$10,000.—The planing mill of W. & F. A. Scott, Galt, Ont., was damaged by fire on the 30th ult. to the extent of \$1,000.—The store of Longard & Sutherland and George R. Archibald, at Lower Stewiacke, N. S., has been destroyed by fire.—At Boiestown, N. B., on the 2nd inst., fire destroyed Wm. McConnell's residence and Herbert McMillan's store and residence. The total loss is \$6,000.—The dry goods store of St. Louis & Mercier, Montreal, has been damaged by fire to the extent of \$20,000.—Four stables at the exhibition grounds, Toronto, were destroyed by fire on Monday last. Loss \$3,000. It is probable they will be rebuilt at once.—The residence of Henry Jones at Alvington, Ont., was burned on Tuesday last.—The laboratory buildings at the Central Experimental Farm, Ottawa, were destroyed by fire on the 7th inst. Loss, \$4,000.

CONTRACTS AWARDED.

ORILLIA, ONT.—J. R. Eaton has been awarded the contract for the new fire hall, to cost \$4,500. W. H. Croker, architect.

BELLEVILLE, ONT.—Walter Alford has been awarded a contract to improve the High and Central schools, at a cost of about \$8,500.

BARRIE, ONT.—Jas. Jerratt, Alliston, Ont., was awarded the contract last week for the new exhibition building and rink here. Kennedy, McVittie & Co., architects.

ELMVALE, ONT.—Mr. Carnohun, painter, has been awarded contracts for residences for T. Simpson, D. Drysdale and R. Bell, and also the new Presbyterian manse.

OTTAWA, ONT.—The contract for constructing the vaults in the Ottawa Trust & Loan Company's offices has been given to J. & J. Taylor, of Toronto. The price is \$20,000.

HALIFAX, N. S.—The contract for erecting a new building, corner Prince and Barrington streets, for George Wright, has been awarded to Mr. Sanders. The price is over \$20,000.

CHATHAM, ONT.—The City of Chatham has just opened tenders for \$31,000 debentures, for which they received a large number of bids. The highest was from Messrs. George A. Stimson & Co., of Toronto, and the bonds have been awarded to that firm. The money was required principally for the extension of the waterworks system purchased a short time ago by the city.

MONTREAL, QUE.—The Montreal Park & Island railway have recently let the contract for the construction of the St. Vincent de Paul branch, to be completed this fall.—G. A. Monette, architect, has

awarded contracts for a church for the St. Lambert parish, St. Lambert, as follows: Masonry, Alex. Failbe; brick, Victor Decary; carpenter and joiner's work, Agnus Mongeau.—L. R. Montbriand, architect, has awarded contracts as follows for two houses on St. Andre street for W. Corcaran. Masonry, Boucher & Huberdeau; carpenter and joiner's work, Wilfrid Mercier; brick, Boucher & Huberdeau; plastering, Ephrem Morache.—W. E. Doran, architect, has awarded the contract for alterations of house on Berri street for Mde J. P. Cuddy to Lambert & Son.—A. C. Hutchison, architect, has awarded contracts as follows for a building on Dorchester street for the Young Women's Christian Association: Masonry, Wighton & Morrison; carpenter and joiner's work, Geo. Roberts; roofing, Montreal Roofing Co.; plumbing and heating, J. Ballantyne; brick, T. W. Peel; plastering, Knott & Gardiner; painting and glazing, George Kimber; iron work, Dominion Bridge Co.

BIDS.

ST. JOHN, N. B.—Tenders were opened by the Board of Works on the 2nd inst. for harbor improvements and wharf extensions at Sand Point. The tenders were as follows: On the plans of City Engineer Peters—Messrs. Mayes, \$194,500; N. K. and M. Connolly, \$233,896; Lynch & Likely, \$234,162. For the same plans, exclusive of dredging, Thomas Thompson, \$83,470; Lynch & Likely, \$104,162. On the plans of C. P. R. Engineer Barber—Messrs. Mayes, \$124,500; N. K. & M. Connolly, \$190,938, and Lynch & Likely, \$190,938. For the same plans, without dredging, Thomas Thomson, \$34,890; Lynch & Likely, \$60,938. Action was deferred until a conference could be held with the City Engineer.

BUSINESS NOTES.

Lang & Co., plumbers, have opened an office at Trail, B. C.

A contracting firm at Lachine, Que., Godin & Legault, have assigned on demand. Liabilities small.

A statement of the affairs of the Erie Iron Works Co., St. Thomas, Ont., shows liabilities of \$18,000 and assets of \$15,000.

The first general meeting of the shareholders of the Victoria Granite Co. will be held at St. George, N. B., on the 16th inst.

Smith & Kennedy, plumbers, Hamilton, Ont., have dissolved partnership, Wm. D. Smith retiring. The business will be continued by J. S. Kennedy.

HOW TO BUILD A CHIMNEY.

Simple as it may seem to build a brick chimney and top it out, it is seldom done in a first-class and workmanlike manner. In the first place, especially in wooden houses, the best and hardest brick is selected for the outside walls or the underpinning, and the soft brick and bats are put into the chimneys. Anyone with a practical knowledge of the requirements of chimney flues will at once recognize the folly of this method. To be sure, they generally use good brick for the top, but it is up through the inside where there is danger of the fire eating through the soft brick and heating the timbers, so that sometimes they become completely charred, and many disastrous fires have been traced directly to this cause. The use of tile flue lining, which, we are glad to note, is rapidly coming into general use, overcomes this evil to a certain degree. Many round tile are now placed in square

flues, the tile being used for smoke and the four corners of the flue for ventilation.

In topping out a chimney there is a wide difference of opinion as regards the best materials to use as mortar. It has often been remarked that houses built in "Ye olden times" had chimneys laid up with simple lime mortar, and when it becomes necessary to tear them down, to make room for more modern structures, they have been found in a good state of preservation; in fact, it is often a hard matter to separate the bricks from the mortar. With a knowledge of this fact, many authorities claim that the masons of to-day do not use as good mortar as the masons of long ago. Their opinion is certainly open to severe criticism. In the first place they used wood as fuel almost entirely, whereas the common fuel to-day is coal. As almost everyone knows, the gases generated by the consumption of the fuel employed are the prime destructors of chimneys, decomposing and destroying the life of the mortar employed, and causing the softer bricks to chip and flake. Now, the gases thrown off from a wood fire are not strong enough to make any perceptible effect on a well constructed chimney; but when coal is the fuel we find a far different state of affairs, and just here we find the reason why the chimney built 100 years ago did not fall to pieces in a few years, like those of the present day. Having found that the gases, or condensation of gases, are the chief factors in the destruction of the chimney, we must employ those materials least susceptible to their ravages, and the experience of some of the most practical mason builders in the country has suggested the following rule: Use only the best and hardest brick throughout the entire chimney, laying them in the best lime mortar to roof, and be particular to fill all joints full. Above the roof use mortar composed of one part lime and four parts cement, with sand enough to work smooth. The plainer the chimney top is in design the better. Saw toothwork and similar ornamentation should be avoided and the largest chimneys should not be drawn out at the head more than 8 in. in each direction. Keep the inside of the flue straight and smooth. Change the bond in setting out the projections in the head to avoid the use of small pieces or "Dutchmen." Do not make the top

course smaller than the shaft of the chimney. On top of the brickwork put a stone coping and fasten the dovels with melted lead, and on top of this coping put a flat smooth stone, supported at each corner by small blocks of stone, whose height must depend on the size of the flue or flues. A strict observance of these rules will give as a result a well built, safe, and durable chimney, which will not be affected by the weather or gases nearly as soon as those built in the ordinary manner.

A HINT ON MORTAR MAKING.

Much depends on having mortar made on correct, if not scientific principles. The durability, if not actual safety, of a building is more or less effected by the kind of mortar that is put into it. We have seen brick building, and not very old ones either, from which the dry and hardened mortar could easily be picked in cakes from between the bricks, says the National Builder. The advantage in using such mortar is, that when the building tumbles down there will be no trouble in picking it from the old bricks, preparatory to rebuilding. A brick wall if put up with the right kind of mortar will be solid and almost homogeneous, as likely to break through the middle as at the joints. Such a building will never tumble down except under great strain, and will withstand a pretty severe earthquake shock.

An old builder of nearly forty years' experience in making mortar, writing upon the subject to a contemporary, very justly says: "The mere matter of slaking lime does not make mortar out of it. Lime and water alone will not make any better mortar than sand and water." He suggests the use of plenty of water in slaking the lime, so that when it is run out of the box into the bed it will not bake or burn, as it is liable to do if not well watered. The mortar bed should be made large and tight, so that there will be no leakage of the lime water. The proportions should be about fifty yards of good sand to twenty-five barrels of lime for the first mixing, which should be thoroughly done. The hair should be put into the lime before mixing in the sand. After the mortar has been worked in the above proportions for ten days or more, if the amount of materials given have been used, twenty-five to fifty loads of sand may be added and worked in. It is said that the water that rises on a bushel of slaked lime, and where plenty of water has been used, if removed, and put on a sharp sand, will make better stone than lime and sand mixed, showing that the water should be retained in the lime and sand while it is fresh, and that the mortar should be tempered in its own liquor. Of course where smaller quantities are used the proportion should be retained both at the first mixing and in the sand added subsequently.

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BRIDGE BUILDERS

BELLEVILLE, ONT.

RAZING A BIG CHIMNEY.

There are instances where the demolition of a structure requires as much study and calculating to meet existing emergencies as are brought into play in the erection of a new edifice. A rather unique method of felling a chimney was resorted to recently at the Old Grove Paper Works, says an exchange. The works have been idle for four years, and are now being dismantled to make room for dwelling improvements. The chimney to be razed was an octagonal one, 270 ft. in height, 27 feet in diameter through the faces, and its total weight estimated at 4,000 tons. On the north side of the works the ground is occupied with streets of cottage property, but toward the south was a stretch of vacant land, and it was in this direction that it was desired to have the immense mass precipitate. This stretch of open ground was very small, and should the chimney fall beyond the limits the damage to adjoining property would be considerable, hence it was desired that the chimney should fall in as small a space as possible. Accordingly about one-half of the base of the chimney was cut away on this side, the structure being supported as work progressed by strong upright timbers in the usual manner. This woodwork was then saturated with paraffine and fired, and in six minutes the chimney leaned slightly, and then breaking into three sections, seemed to telescope, and fell in an area not much greater than the base of the chimney.

LIME MORTAR IN FREEZING WEATHER.

There is a popular fallacy to which a great many masons adhere most tenaciously, that the addition of lime to cement mortar is desirable if the work is to be carried out in freezing weather. Upon what reasoning such a solution is based it is impossible to determine, though there seems to be a vague feeling that because the lime in slacking becomes very hot, it therefore must impart a certain portion of its heat to the mortar and so retard any effect of freezing weather. This is not only illogical, but it is not warranted by facts. Lime is slacked in cold water; it is then mixed with cold sand and cold cement, and is on ordinary building operations carried a long distance through the cold atmosphere, so that by the time that it is actually laid up with the cold bricks in the cold wall all heat virtue has departed and the lime is absolutely inert in caloric. So much for theory. To determine the practical effect, tests were made last winter during the course of the construction of one of our largest buildings. Upon the coldest day of the winter, when the thermometer registered below zero, two brick piers were constructed under as nearly as

possible the exact conditions which would obtain in a wall. The piers were a little over 1 ft. high. One was laid up with mortar composed of 1 part lime, 2 parts cement, and 4 parts sand. The mortar of the other was composed of 2 parts cement and 4 parts sand. The piers were allowed to stand under cover which would protect them from beating storms, but they were exposed to alternate freezing and thawing, effects of the temperature during a period of about three months. At the end of that time it was found that the mortar containing lime was considerably disintegrated, so that it could be crumbled easily between the fingers, while the cement mortar, though somewhat injured by frost, was still reasonably firm and hard. The first pier was dropped to the floor through a distance of 4 to 5 ft. and was entirely destroyed, no bricks adhering to each other. Dropping the cement mortar pier through the same distance, it broke in two pieces, and not until it had been violently dashed against the floor six times was it entirely destroyed. Even then some of the bricks broke before the mortar became dislodged.

The reason for this action of the two mortars is very apparent. The addition of lime to cement mortar tends to retard

the setting. Consequently there would be a considerable period during which the cold weather could act disastrously upon the mortar. Furthermore, lime mortar sets by absorbing carbonic acid from the air, a process which takes a great deal of time. Cement mortar, on the contrary, sets by crystallization, and a few moments after it is in place in the wall the outer surface has taken a sufficient set to serve as at least a slight protection against the cold, while long before the lime mortar mixture would be hard the cement mortar would be so completely crystallized that the cold would have comparatively little effect upon it. Consequently the addition of lime to cement mortar is a positive detriment in every sense.—The Brick-builder.

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In the Japanese capital there is a gigantic image of a woman, made of wood and plaster, and dedicated to Hachiman, the god of war. In height it measures 54 feet, the head alone, which is reached by a winding staircase in the interior of the figure, being large enough to comfortably hold twenty persons. The figure holds a huge wooden sword in one hand, the blade of the weapon being 27 ft. long, and a ball 12 ft. in diameter in the other. Internally, the model is fitted up with an extraordinary anatomical arrangement, which is supposed to represent the different portions of the brain. A fine view of the country is obtained by looking through one of the eyes of the figure. The admission to all parts of the structure is two cents.

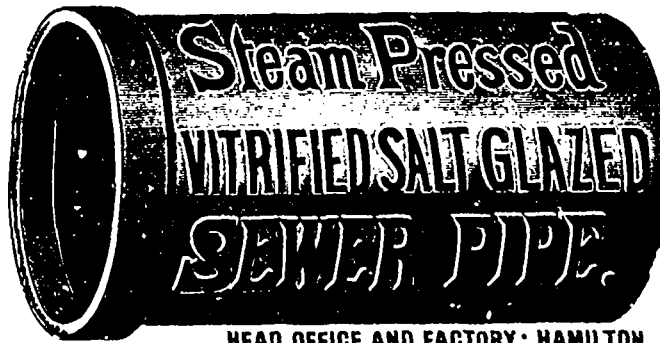
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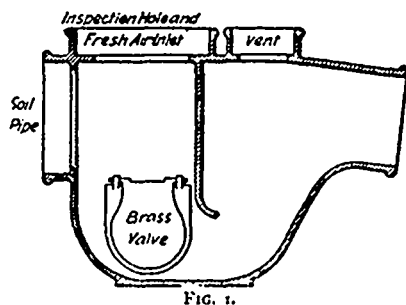
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THE SEWERAGE OF VICTORIA, B. C. (Concluded.)

House connections not intended for immediate use were fitted with earthenware stoppers through which the ground water was allowed to percolate into the sewers to render them self-cleansing until the population has increased to call for the full capacity of the sewers. At each junction a piece of 2x2-inch scantling was brought to the surface.

In order to have a trustworthy record of the positions of the junctions, plans on a scale of 50 feet to 1 inch were prepared showing all manholes, ventilators, flush tanks and junctions, with the measurements of the last from fixed points. On these plans are also shown all buildings with the position of the house pipes, and the points at which they enter the building to connect with closets, baths, sinks, etc. They also show the nature of the subsoil, whether earth, hardpan or rock. The drainage of basements, and the admission to the sewers of subsoil water, and the exclusion of sewage from the basement drains were matters which received considerable consideration. To attain the foregoing results a special trap was designed, which so far has been



found to answer the purpose (see Fig' 1). This trap is sometimes placed under the sidewalk, sometimes in the basement in a sump hole below the level of the floor, in which the subsoil water is collected. Its body is of cast iron; it is provided with ventilator and fresh air inlet; the subsoil water enters through a brass flap valve with ground faces. The valve can only open to admit the subsoil water when the head exceeds that of the sewage pressing against its inner side. To prevent foreign substances entering the trap through the valve a fine grating is provided. Mr. Mohun has suggested that in addition to the grating the water should pass through a filter of small shingle. Several of these traps have been in use for the past two or three years, and it is believed have given general satisfaction. The method of hanging the valve has proved simple and efficacious. The flap is suspended from two hooks which allow it a slight horizontal play, so that when the pressure is applied from the inside, the ground faces are immediately brought into close contact.

HINTS ON ROAD-MAKING.

By A. W. CAMPBELL, C. E.

DRAINAGE.

Perfect drainage, first, of the foundation of the road-bed; secondly, of the road surface, are the points in road-making on which too much stress cannot be laid.

The first is accomplished by under-drainage, tile drains being laid at a depth of three or more feet below the surface on each side of the roadbed at the foot of the grade and parallel to it. Care should be taken to fit and settle the tile in the trench, so that when refilling with earth, they will not be displaced. As a rule two and one half inch to four inch tile will be sufficient. The joints should be close and the grade a true line. Loose joints and an uneven grade allow silt to pass into the tile and remain there, destroying the drain.

Surface drainage is accomplished by open drains on each side of the grade, having sufficient capacity to drain, not only the roadbed, but the land adjoining. With open drains and with tile drains make and maintain a free outlet to the nearest watercourse. A drain without an outlet is useless. In constructing a good road a dry foundation is the matter of first importance.

CROWNING THE ROAD.

The graded portion of the road should be wide enough to accommodate the travel upon it, and not greater, the slope being uniform, not heaped in the centre. The crown should be well above the overflow of storm water and should have a grade sufficient to shed water readily to the open ditches on either side. Do not round it up so as to make the grade steep and dangerous, under the mistaken impression that better drainage will thereby be secured. Nor should it be so low as to allow water to stand upon it in depressions. Under ordinary circumstances one inch to one inch and a half to the foot is a proper grade; that is, a roadbed twenty-six feet wide should be from thirteen to twenty inches higher at the centre than at the side.

QUALITY OF GRAVEL.

The gravel should preferably be sharp, clean and of uniform size. Pit gravel usually contains too much earthy matter, and where the latter is in excess, the gravel, as a road-making material, is useless. Lake gravel is apt to be rounded, water-worn and lacking in the necessary earthy matter to make a solid and compact surface, but it is generally a better road metal than pit gravel. A coating of pit gravel with a surfacing of creek gravel is a good combination. All large stones should be removed, as they will work to the surface, and will then roll loosely or form rough protuberances.

PLACING THE GRAVEL.

The gravel should be spread evenly over the surface of the subgrade to a depth of six or eight inches, and to the required width, then rolled with a heavy roller. Rolling should be performed in showery weather, as it is impossible to consolidate dry earth or gravel. The

heavier the roller the better will be the results, but if a heavy roller cannot be obtained, a light roller is much better than none. The roller should be passed over the surface until the gravel or earth is so compact as not to be displaced and rutted by the wheels of a wagon passing over it with an ordinary load. The surface must be maintained smooth and hard, to shed water and resist wear. Every municipality should have a roller, but whether one can be obtained or not the gravel should not be left in a heap just as it falls from the wagon. Spread it evenly.

REPAIRS.

Gravel roads already constructed will need repair. By the use of road machinery scrape the surface and cut off the corners, which will have formed at the foot of the grade by the washing down of dusty material from the crown of the road. Loosen the surface, particularly that part of the travelled portion and where the road is rutted, with picks, or, if possible, with road machinery, then apply a coating of gravel and roll thoroughly. It is of more importance, however, to see that the drains are not obstructed in their course and that their outlets are free and open.

PAPER BRICKS.

Paper is indeed becoming one of the most useful articles which we have. There have lately been tests made of the new paving brick of paper pulp. A brick four inches square and eight inches long weighed three pounds, whereas a brick exactly the same size made of clay weighs as much as ten pounds. The color of the paper pulp brick is the same as that of vitrified brick in use in many cities. The inventor makes these bricks from ordinary wood or the straw pulp from which paper is made, and reduces it to a mush by the use of water. He then adds sulphate of zinc as a preservative, and the material being thoroughly mixed is put into a vat where several other chemicals are added. These chemicals are the secret of the inventor. The bricks, or rather the pulp, having been subjected to a pressure of 2,000 lbs. to the square inch, is then placed in a kiln and baked for forty-eight hours at a heat of 200° F. The inventor thinks it will do for other things besides paving, and he says it will be absolutely indestructible. Conduits for the use of electric telephone cables are about to be made of this substance, and, in fact, it will be useful for anything for which at present wood or bricks are used.—Invention.

Men are doing great things now-a-days in the way of bridges, waterworks, &c., but we doubt if any city can show a greater triumph of engineering as to its water supply than ancient Rome. Eight immense aqueducts supplied the city with pure spring water from the hills, delivering forty millions of cubic feet daily. The Claudia aqueduct was forty-seven miles long and 100 ft high. The Marcia was forty-one miles, thirty-seven miles of which were carried on 7,000 arches seventy feet high.

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Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: Builders' supplies are in a condition very unsatisfactory to the trade so far as Toronto is concerned. In London and Hamilton a better feeling exists and purchases are made with more freedom. For country account there is a fair call for supplies. Orders are coming in a little more freely for cut nails. The base price is \$2.55 per keg, with a rebate of 5c. allowed to retailers. An advance of 1/8c. per lb. is announced in galvanized iron, for which there is a good demand. Iron pipe also shows considerable life.

MONTREAL: The past week's transactions have been confined to immediate requirements, with the result that a restricted trade has been done. In no line is there much activity. Paints and oils are in greater demand, perhaps, than other lines, with prices steady. There has been no improvement in cement, and sales thus far this season are reported to be the smallest for many years past. The demand is principally for small lots to fill actual needs. Arrivals have been of an average, but prices notwithstanding, hold firm.

LUMBER.

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	Toronto.	Montreal.
1/4 to 2 clear picks, Am ins.	33 00@36 00	40 00@45 00
1/4 to 2 three uppers, Am ins.	37 00	40 00 45 00
1/4 to 2, pickings, Am ins.	26 00	27 00 30 00
1/2 inch clear		40 00 45 00
1 x 10 and 12 dressing and 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 32 00	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
1 1/2 and thicker cutting up plank	24 00 26 00	22 00 24 00
1 inch strips, 4 in to 2 in. mill run	14 00 15 00	14 00 15 00
1 inch strips, common	11 00 12 00	10 00 12 00
1 1/2 inch flooring	16 00 17 00	12 00 15 00
1 1/2 inch flooring	16 00 17 00	12 00 15 00
XXX shingles, sawn, per M	2 30 2 40	2 60 2 60
16 in.	1 40	1 50 1 60
XXX shingles, sawn	2 00	1 50
Lath		2 00
YARD 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 15 00	16 00
" " " " 18 ft	15 00 16 00	16 00
" " " " 20 ft	16 00 17 00	17 00
" " " " 22 ft	17 00 18 00	18 00
" " " " 24 ft	18 00 19 00	19 00
" " " " 26 ft	19 00 20 00	20 00
" " " " 28 ft	20 00 21 00	21 00
" " " " 30 ft	21 00 22 00	22 00
" " " " 32 ft	22 00 23 00	23 00
" " " " 34 ft	23 00 24 00	24 00
" " " " 36 ft	24 00 25 00	25 00
" " " " 38 ft	25 00 26 00	26 00
" " " " 40 ft	26 00 27 00	27 00
Cutting up planks, 1 1/2 and thicker, dry	25 00 28 00	25 00 30 00
B. M.		
1 1/2 in. flooring, dressed, F. M.	26 00	30 00 31 00
1 1/2 inch flooring, rough, B. M.	18 00	22 00 23 00
1 1/2 " " dressed, F. M.	25 00	28 00 30 00
1 1/2 " " undressed, B. M.	18 00	19 00 19 00
1 1/2 " " dressed	18 00 20 00	18 00 22 00
1 1/2 " " undressed	12 00 15 00	12 00 15 00
Beaded sheeting, dressed	20 00	35 00 35 00
Clapboarding, dressed	12 00	8 00 12 00
XXX sawn shingles, per M	2 60 2 70	3 00
18 in.	2 40	2 60
Sawn lath	2 50	2 60
Cedar	2 90	2 90
Red oak	30 00	30 00 40 00
White	37 00	35 00 55 00
Basswood, No. 1 and 2	28 00	30 00 20 00
Cherry, No. 1 and 2	70 00	70 00 80 00
White ash, No. 1 and 2	24 00	30 00 35 00
Black Ash, No. 1 and 2	20 00	18 00 30 00
Dressing stocks	16 00	22 00 22 00
Picks, American inspection	30 00	40 00
Three uppers, Am. inspection	50 00	50 00

Toronto. Montreal.

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Common Walling	6 50	6 00
Good Facing	8 00	8 50
Sewer	8 50	8 50 9 00
Pressed Brick, Per M		
Red, No. 1, f.o.b. Beamsville	16 00	
" " 2	14 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	
Hip Tile (each)	20	
Ridge Tile	60	
1st quality, f.o.b. at Port Credit and " "	14 00	18 00
" " " " " "	12 00	15 00
" " " " " "	8 00	12 00
Hard building brick	6 50	
Ornamental, per 100	7 00	10 00

Per Load of 1 1/2 Cubic Yards

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	
Balochmyle	80	90
New York Blue Stone	65	75
Granite (Stanstead) Ashlar, 6 in. to 12 in., rise 9 in., per ft. Most Freestone	25	60 75
Thomson's Gatelawbridge, cu. ft.	75	80
Credit Valley Rubble, per car of 15 tons, at quarry	8 00	
Credit Valley Brown Coursing, up to 10 inch, per sup. yard, at quarry	1 75	3 25
Credit Valley Brown Dimension, per cu. ft. at quarry	60	75
Credit Valley Grey Coursing, per superficial yard	1 50	2 00
Credit Valley Grey Dimension, per cubic foot	60	75
Clark's N. B. Brown Stone, per cubic foot, f.o.b.	1 15	1 00
Brown Free Stone, Wood-point, Sackville, N. B., per cu. 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 (olive green)	90	70

OHIO FREESTONE, FROM THE GRAPTON STONE CO.'S QUARRIES.

No. 1 Buff Promiscuous	90	1 00
No. 1 Buff Dimension	95	1 05
No. 1 Blue Promiscuous	70	75
No. 1 Blue Dimension	65	75
Sawed Ashlar, No. 1 Buff, any thickness, per cu. ft.	1 10	1 20
Sawed Ashlar, No. 1 Blue, any thickness, per cu. ft.	85	90
Sawed Flagging, per sq. ft., for each inch in thickness.	06 1/2	07 1/2
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 00
Granite paving blocks, 8 in. to 12 in. x 6 in. x 4 1/2 in., per M	50 00	
Granite curbing stone, 6 in. x 20 in., per lineal foot	70	

SLATE.

Roofing (8 square)		
" red	18 00	20 00
" purple	10 00	10 00
" unloading 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.	6 25	5 50	6 00
zinc, Can., "	6 50	7 50	7 50
Red lead, Eng.	4 00	5 00	4 50
" venetian, per 100 lbs.	1 60	1 75	1 60
" vermilion	90	1 00	1 10
" Indian, Eng.	10	12	12
Yellow ochre	5	5	5
Yellow chrome	15	20	20
Green, chrome	7	12	12
" Paris	20	25	20
Black lamp	15	12	12
Blue, ultramarine	15	20	18
Oil, linseed, raw, & Imp. gal.	54	59	59
" " boiled	57	63	63
" " refined	78	85	75
Patty	24	24	24
Whiting, dry, per 100 lbs.	75	1 00	75
Paris white, Eng., dry	90	1 25	90
Litharge, Eng.	4	5	4 50
Sienna, barn.	10	15	15
Umber	8 1/2	12	12

CEMENT, LIME, etc.

Portland Cements—		
German, per Sbl.	3 25	2 55 2 65
London	2 50	2 75 2 92 2 05

Toronto. Montreal.

Portland Cements.—

Newcastle	2 50	1 85	1 95
Belgian, Joss-n, artificial	3 40	2 50	2 75
English, artificial, per bbl.	2 60	2 55	2 65
Belgian, natural, per bbl.	2 30	2 40	2 45
Canadian	2 30	2 50	2 55
Roman		1 80	1 85
Farian	4 50	4 75	5 10
Superfine	6 50	7 00	8 00

Hydraulic Cements.—

Thorold, per bbl.	1 50	1 25	1 50
Queenston, "	1 50	1 50	1 60
Napanee, "	1 50		1 50
Hull, "	1 50		1 50
Ontario, "	1 25		

Keene's Coarse "Whites"

4 50	4 75	4 50	4 75
Fire Bricks, Newcastle, per M	27 00	33 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 63	2 25
Steel " " " "	2 75	2 50
CUT NAILS, FENCE AND CUT SPIKES.		
40d, hot cut, per 100 lbs	2 70	2 30
30d, " " " "	2 75	2 31
20d, 16d and 12d, hot cut, per 100 lbs.	2 80	2 40
10d, hot cut, per 100 lbs.	2 85	2 45
8d, 9d, " " " "	2 90	2 50
6d, 7d, " " " "	3 05	2 65
4d to 5d, " " " "	3 25	2 85
3d, " " " "	3 65	3 25
2d, " " " "	4 15	3 75
4d to 5d cold cut, not polished or blued, per 100 lbs.	3 35	2 75
3d to 5d cold cut, not polished or blued, per 100 lbs.	3 55	3 15
FINE BLUED NAILS.		
3d, per 100 lbs.	4 00	3 75
2d, " " " "	4 50	4 15

CASING AND BOX, FLOORING, SHOOK AND TOBACCO BOX NAILS.

12d to 30d, per 100 lbs.	2 50	2 60
10d, " " " "	2 80	2 70
8d and 9d, " " " "	2 95	2 80
6d and 7d, " " " "	3 10	3 05
4d to 5d, " " " "	3 30	3 20
3d, " " " "	3 70	3 60

FINISHING NAILS.

3/4 inch, per 100 lbs.	3 10	2 95
2 1/2 to 2 3/4 " " " "	3 25	3 10
2 to 2 1/2 " " " "	3 40	3 25
1 1/2 to 1 3/4 " " " "	3 60	3 45
1 1/4 " " " "	4 00	3 85
1 " " " "	4 50	4 35

SLATING NAILS.

5d, per 100 lbs.	3 35	2 95
4d, " " " "	3 35	2 95
3d, " " " "	3 75	3 35
2d, " " " "	4 25	3 85

COMMON BARREL NAILS.

1 inch, per 100 lbs.	3 75	3 35
3/4 " " " "	4 25	3 60
3/8 " " " "	4 75	4 35

CLINCH NAILS.

3/4 inch, per 100 lbs.	3 35	2 95
2 1/2 and 2 3/4 " " " "	3 50	3 10
2 and 2 1/2 " " " "	3 65	3 25
1 1/2 and 1 3/4 " " " "	3 85	3 45
1 1/4 " " " "	4 50	4 10
1 " " " "	5 00	4 60

SHARP AND FLAT PRESSED NAILS.

3/4 inch, per 100 lbs.	3 75	3 45
2 1/2 and 2 3/4 " " " "	4 00	3 60
2 and 2 1/2 " " " "	4 20	3 75
1 1/2 and 1 3/4 " " " "	4 40	3 95
1 " " " "	5 00	4 60
" " " "	5 50	5 10

STEEL WIRE NAILS.

Steel Wire Nails, 70c; 5% discount from printed list.

Iron Pipe:

Iron pipe, 1/2 inch, per foot	6c.	6c.
" " 3/4 " " "	7	7
" " 1 " " "	8 1/2	8 1/2
" " 1 1/4 " " "	12	12
" " 1 1/2 " " "	17	17
" " 2 " " "	24	24
" " 2 1/2 " " "	30	30
" " 3 " " "	43	43