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VOL. 7.

MARCH 26, 1896

No. 8.

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TO CONTRACTORS

Sealed Tenders will be received by the undersigned, Chairman of the Property Committee of the Barrie Public Board, up to

Noon of Friday, 10th April, 1896

for carrying out, during the ensuing midsummer holidays, the proposed alterations and additions (including a system of Steam Heating and Ventilation) to the Barrie Model School.

Tenders will be received either for the whole work or separate portions.

Plans and specifications may be seen at the office of Messrs. Kennedy, McVittie & Co., Architects, Barrie, Ont.

Parties tendering must be prepared, should their tender be accepted, to enter into a contract with the Board with such sureties as the Board may deem sufficient for the due performance of their contract.

The lowest or any tender not necessarily accepted.

G. G. SMITH,
Chairman Property Committee.

Dated 24th March, 1896.

TENDERS

are being received on the Consumptive Sanatorium, Muskoka, by
GEO. M. MILLER & CO., Architects,
18 King St. E., Toronto.

CONTRACTS OPEN.

ST. THOMAS, ONT.—The county buildings will be enlarged.

HOPE, B. C.—J. Carrigan contemplates the erection of a new hotel.

GANANOQUE, ONT.—The town will purchase a supply of lumber.

TILEY, ONT.—The Tilley Creamery Co. will build a butter factory.

MIDDLEVILLE, ONT.—R. C. Somerville will erect a brick residence, to cost \$1,000.

KEMPTVILLE, ONT.—Alonzo Bower, of Mountain, proposes to erect a roller mill here.

CASTOR CENTRE, ONT.—J. H. Wilcox intends building a new residence next summer.

TILBURY CENTRE, ONT.—M. Stewart will erect a brick block, corner Queen and Yonge streets.

MOLESWORTH, ONT.—The Presbyterian congregation have decided to build a new church.

ARNPRIOR, ONT.—Plans are being prepared for a residence in Arnprior for an Ottawa gentleman.

LACHUTE, QUE.—R. Prevost, of Montreal, is negotiating with the council to establish a factory here.

PETROLEA, ONT.—The nitro-glycerine works of H. Corey & Sons were destroyed by an explosion last week.

HINTONBURG, ONT.—The ratepayers will vote on a by-law on the 11th of April to issue debentures for \$10,000.

RICHIBUCTO, N. B.—The Presbyterians of Harcourt and Millbranch expect to commence the erection of a manse this summer.

RICHMOND, QUE.—It is probable that the waterworks company will make improvements to their plant during the coming summer.

MACTNAQUAC, N. B.—The Baptist congregation will erect a new church, at a cost of \$2,000. Contracts will be awarded at an early date.

REGINA, N. W. T.—The sum of \$16,000 has been placed in the supplementary estimates for the erection of a new land office at this place.

WOODSTOCK, N. B. Subscriptions to the building fund for the proposed new Knox church amount to \$16,000. About \$35,000 will be required.

FLINTON, ONT. The new St. Paul's Anglican church will be Gothic style, 50 x 20 ft., stone foundation and brick walls, estimated cost, \$1,400. Contract not let. Work will be commenced as soon as weather will permit. Rev. Hugh J. Spencer, rector.

LANG, ONT.—Tenders for painting the

new Bethel church at Otonabee will be received by Geo. Fife, of this place, until Saturday, the 4th of April.

LISTOWEL, ONT.—The Building Committee of Christ church are considering the plans for their new church. A number of plans have been received.

EDMONTON, N. W. T.—The Hudson's Bay Company have subscribed \$5,000 towards the new traffic bridge to be constructed across the Saskatchewan river.

SYDNEY, C. B.—John McDougall, municipal clerk, will receive proposals until the 29th inst., from parties desirous of loaning \$25,000 to the municipality.

ROCKPORT, ONT.—Extensive preparations are now in progress for a new English church, to be built here the coming summer by Rev. C. J. Young, incumbent.

BELLEVILLE, ONT.—Tenders for the building of a stone and wood school house for school section No. 17, Tyendinaga, will be received by Geo. Purdy up to the 28th inst.

HARWICH, ONT.—The County Council have accepted the plans of Mr. Wilson, architect, of Chatham, for a new township vault. Tenders for construction will be asked at once.

WHITBY, ONT.—Proposals will be received by Thos. Huston, town treasurer, until the 1st of April, for the purchase of \$22,800 of debentures, bearing interest at the rate of 4 per cent.

DIGBY, N. S.—W. S. Troop will build a new hotel. It will be 60 x 40 feet, two and a half stories in height, and will contain twenty large rooms, to be fitted up with all conveniences.

ST. JOHN, N. B.—The school trustees are asking \$80,000 for school purposes during the present year, exclusive of the cost of the high school building which it is proposed to erect.

FREDERICTON, N. B.—W. Harvey Lawrence is preparing to build a large tannery and shoe factory at Cardigan, on the Gibson branch of the C. P. R., about 13 miles from this city.

AHMIC ARBOR, ONT.—John Crowell, secretary-treasurer school board, will receive tenders until the 4th of April for erecting a new school house. Plans may be seen at the secretary's office.

GUELPH, ONT.—D. Sturton, chairman board of managers of Chalmers church, will receive tenders until Wednesday, the 1st of April, for the erection of galleries and other alterations to the church buildings.

BROCKVILLE, ONT.—At a recent meeting of the Brockville Electric Street Railway Company, the agreement with the town council was formally ratified. Work is to be commenced not later than May, 1897.

ST. JEROME, QUE.—The question of making alterations and additions to the court house and prison is under consideration by the City Council. The pro-

posed repairs are estimated to cost \$12,000.

PORT ARTHUR, ONT.—The ratepayers have decided to let the contract to the Port Arthur Light and Power Co. for installing an electric light plant and waterworks system and the building of a pulp mill.

RAT PORTAGE, ONT.—The Public School Board has requested the council to grant the sum of \$15,000 for the erection of new buildings and additions to the present schools.—Jacob Hlose is preparing to erect a brick block.

QUEBEC, QUE.—Definite information is expected in a few days regarding the construction of the proposed electric railway. There is also a proposal for the construction of an electric road from Chicoutimi to St. Alphonse.

AVONDALE, N. S.—Tenders for the erection of a brick building at Windsor will be received by W. Mosher, until the 31st inst. Plans may be seen at the offices of J. P. Graham, Windsor, and J. C. Dumaresq, architect, Halifax.

GODERICH, ONT.—The Kensington Furniture Co., which has recently been organized, will erect factory buildings, 110 x 60 feet, of white brick, and will put in the latest and most improved machinery. Mr. William Hinton is manager.

REVELSTOKE, B. C.—It has been practically decided to build a connecting link of railway between the Nakusp and Slocan and the Columbia and Kootenay railway during the coming summer, with Roseberry and Slocan Crossing as the terminal points.

RENFREW, ONT.—Tenders are invited by Wm. Mackay until Saturday next, the 28th inst., for the erection of a brick block on Main street, from plans prepared by Mr. C. Edey, architect, Ottawa, and which may be seen at the office of Mackay & Matheson.

KINGSTON, ONT.—Tenders will be received by W. Newlands, architect, up to 6 p. m. to-day (Thursday) for improvements to buildings on Princess street.—Efforts are being made to secure the necessary funds for the erection of a new Baptist church in this city.

PETERBORO', ONT.—A deputation from Peterboro' County has requested the Ontario government to grant an appropriation of \$2,500 for repairs to a bridge known as the Peterboro', Victoria and Summerville bridge. The government considered the proposition favorably.

STRATFORD, ONT.—The committee of the Council of Perth County have decided to recommend for the new county poor house a building with accommodation for one hundred inmates. The building will be of white brick with brown stone trimmings and slate roof. H. J. Powell, of Stratford, is the architect.

NAPANEE, ONT.—Mrs. J. D. Ham will build a new residence, at a cost of \$5,000.—Wm. Ferguson, of South Napanee, proposes building a brick residence.—The town clerk will receive tenders on behalf of the corporation until the 10th of April for the supply of plank, stringers, nails, broken stone, glazed tile, etc.

HALIFAX, N. S.—W. L. Brown, city treasurer, will receive offers until Monday, the 20th of April, for two loans, one for \$213,000, and the other for \$6,000, bearing interest at the rate of 4 per cent. per annum.—At a meeting of the governors of King's college, it was decided to extend the collegiate school buildings. The school committee was authorized to carry out the proposed improvements, at a cost of \$4,000.

NIARARA FALLS, ONT.—A meeting of the Niagara Falls International Bridge Co., which operates the railway suspension bridge spanning the gorge, was held here recently to consider certain contracts with the Grand Trunk Railway Co. in relation

to the rental of a proposed new bridge which the company will shortly construct. The new bridge is to be a single arch of the spandril-braced type, built to accommodate double railway tracks as well as carriage ways and pedestrian walks.

CHATHAM, ONT.—A syndicate having control of the malt house property have instructed an architect to prepare plans for a terrace of two-storey houses, to be erected at a cost of \$12,000.—The Chatham City & Suburban Railway Company will make application to the Ontario legislature during the present session for incorporation to construct an electric railway from the city of Chatham to a point at Lake Erie, with a line through the township of Dover to Wallaceburg, and thence to Petrolia.

HAMILTON, ONT.—Efforts are being made to induce the Hamilton Radial Co. to extend its line beyond Burlington, through Waterdown to Guelph.—Tenders for the erection of a dwelling on Maria street for J. C. Ramsay will be received by A. W. Peene, architect, until the 30th inst.—The Sewers Committee last week considered plans for the disposal of sewage. The City Engineer recommended the adoption of the chemical precipitation system similar to that in use at Canton, Ohio. The Engineer and Chairman Teneyck were authorized to visit Canton and get full information.

PERTH, ONT.—The following new buildings will be erected this summer. White brick dwelling on Lewis st., Caroline Village, by Mr. Francis Davies; red brick dwelling on North st., by Mr. John Charles; red brick dwelling on North st., by Mr. Joseph H. Charles; white brick dwelling on West Gore st., by Mrs. J. K. Affleck; two story red brick dwelling on Grant-Matheson section, by Mr. James Woods; two red brick dwellings in same neighborhood by Dr. Grant; frame dwelling, East Ward, by Mr. Stephen Bennett; two storey red brick dwelling on Drummond st., opposite court house, by Mr. M. Lapoint.

COLLINGWOOD, ONT.—Plans are being prepared for a pair of semi-detached cottages by Fred T. Hodgson, architect, for which tenders for erection will shortly be asked. The cottages will contain from ten to twelve rooms each two stories high, with stone basements, pressed brick and terra cotta facings, cut stone sills, quoins, skewbacks and chimney caps; the buildings throughout are to be furnished with all modern improvements in heating, lighting and water. Lower front rooms, halls and stairways to be furnished in pollard and quartered white oak, upper front rooms in mahogany birch, painted windows in halls and dining rooms. The outlook for building this season is fair.

LONDON, ONT.—McBride & Farncombe, architects, will receive tenders until Saturday, the 28th inst., for the erection of a brick block on Dundas street.—Tenders are invited by J. B. Little, Scottsville, until the 26th inst. for mason and carpenter work on church building, three miles from Lambeth.—The trustees of Wortley Road Baptist church have received tenders for the erection of a new building, the lowest being \$7,000. The available funds are only about \$4,500, and it is probable that the erection of the church will be postponed for the present.—Tenders are invited by John Heamen, chairman of No. 3 committee, until the 1st of April for the necessary supplies for the fire department.—Herbert Mathews, architect, will receive tenders until Wednesday, the 5th of April, for building a pair of semi-detached dwellings on Horton street, for Mr. Isaac Duffield.

HULL, QUE.—The foundation is being prepared for the electric power house.—At a recent meeting of the Waterworks Committee of the City Council it was decided that unless the present contractor

resumes operations at once, the city will take over the contract for the waterworks construction and perform the work by day labor.—Tenders are invited by A. C. Thibault, treasurer, for the purchase of \$108,000 of debentures, bearing interest at 5 per cent., payable semi-annually.—The plans of Mr. Hibbard, C. E., for an iron bridge across Brewery creek at Eddyville, to cost \$4,000, have been accepted by the town council.—Mr. Hibbard has also been instructed to prepare plans for a bridge at the cemetery.—The Aylmer branch of the Canadian Pacific Railway has become the property of the Hull Electric Company, and is to be converted into an electric road within a couple of months. Among the gentlemen interested are Chas. Magee, W. J. Conroy and J. B. Fraser.

OTTAWA, ONT.—Edward Wallace, Chairman Board of Works, will receive tenders until the 1st of April for the supply of hardware and explosives required by the corporation for street improvements during the year. Specifications may be seen at the city engineer's office.—The bill respecting the Pontiac Pacific Junction Railway gives power to extend the line from Waltham to Sault Ste. Marie and to build a branch line in a northwesterly direction to a point in the province of Quebec. Power is also requested to build bridges over the Ottawa river at different points.—At a recent meeting of the waterworks committee the question of waterworks extensions was considered. It was decided to invite tenders for the entire work, but if the prices are not satisfactory the work will be carried out by day labor.—A. M. Calderon, architect, invites tenders until the 28th inst. for building an addition to the Ottawa Amateur Athletic Association building on Elgin street.—Tenders are invited by the Waterworks Committee, addressed to John C. Grant, chairman, until Thursday, the 14th of April, for the annual supply of oils, lead pipe, brass work, hardware, hydrants, valves, castings, cast iron pipe and fire alarm supplies.

MONTREAL, QUE.—Watson & Foster will build an additional wall paper factory, 325 x 106 feet, and a warehouse 108 feet square.—The old Canada Life Assurance Co.'s building has been sold to a syndicate, the members of which intend to convert the premises into a first-class restaurant. The building will be entirely remodelled and decorated throughout.—Alterations will be made during the summer in the quarters of the Y. W. C. A.—The market committee have recommended that improvements be made to St. Lawrence market.—The Montreal Park & Island Railway Company will this summer build seven miles of double track to Lachine, seven miles to St. Laurent, and four miles to St. Vincent de Paul, including a bridge over the Back river, to cost \$20,000.—The Town Council of Maisonneuve have under consideration a proposal to erect a tapestry factory, at a cost of \$12,000.—Building permits have been granted as follows: Estate Chenier, warehouse on St. Amable st., three stories, in stone and brick, cost \$5,000; Rheume & Belanger, house on Amherst st., two stories in stone and brick, cost \$2,600.—Mr. W. C. McDonald has donated a further sum of half a million dollars to McGill University, for the purpose of providing a building for the study of chemistry, mining and architecture.

TORONTO, ONT.—A deputation from this city has requested that a sum be appropriated by the Dominion government for the construction of a riding school east of the armouries, for which a vote of \$40,000 was placed in the estimates in 1893.—The congregation of the Church of the Covenant, Davenport Road, desire a site for a new church building. Nothing definite has as yet been decided upon regarding building operations, but in all

probability a solid brick or stone building will be built. The school room is to be erected first, and the church building at a later date, when the finances will warrant.—Additions to the House of Industry will probably be carried out at an early date, as the present accommodation is proving inadequate. A request was made to the city council some time ago for \$35,000 for this purpose.—The Ontario Legislature has been asked to grant incorporation to the South Essex Electric Railway Co.—The City Engineer in his fortnightly report presented to the City Council on Monday last, recommends the construction of the following works: On Simcoe street, from south side of Station street, 34-foot cedar block pavement on concrete foundation, with stone kerbs, cost \$1,850; on Station street, 46-foot cedar block pavement from east side of Simcoe street to the west side of York street, cost \$6,400; on York street, from the G. T. R. to Front street, a 30-foot cedar block pavement, cost \$3,170; on Yorkville avenue, a 27-foot cedar block pavement on sand and gravel foundation, with kerbs, from Yonge street to Avenue road, cost \$5,430; on West Market and Jarvis streets, from north side of Front street to the south side of King street, macadam pavement with stone kerbs, the area under the St. Lawrence market to be paved with asphalt or brick, cost \$9,440 for asphalt and macadam and \$6,000 for brick and macadam.—D. M. Macpherson, president of the Dominion Cold Storage Co., has submitted a proposition to the City Council for the lease of the old drill shed and the adjoining lot. The company offer to construct buildings and plant, estimated to cost \$150,000.—Building permits have been granted as follows. Mr. Pember, mansard roof to stores, 127-129 Yonge st., cost \$1,200; The T. Eaton Co., additional storey to new buildings on Queen and James sts., cost \$5,000.

CHICOUTIMI, QUE.—Mr. J. C. Guay and Joseph Gagnon, representatives of the Chicoutimi Electric Co., are negotiating with the town council for the construction of an electric railway between St. Alphonse and Chicoutimi.

FIRES.

Tucker & Hodge's saw mill at Westmeath, Ont., was burned on the 18th inst. Loss partially covered by insurance.—The double tenement house of H. H. Wilson, at Danville, Que., was completely destroyed by fire on Saturday last.—Alex. Thompson's furniture factory on York street, Hamilton, was badly damaged by fire on the 18th inst. Loss \$2,500, covered by insurance.—Fire at Souris, Man., on Sunday last destroyed the Patrick block, containing the Plaindealer newspaper office, Mosher & Co.'s private bank and Patrick & Co.'s office. Loss \$5,000, partially insured.—George Stalker's net sheds at Collingwood, Ont., have been burned. Loss \$3,000; small insurance.—The Hastings Shingle Manufacturing Co.'s plant at Hastings, B. C., was destroyed by fire recently. Loss, \$8,000; insurance \$3,000.—The brick residence of Dr. J. J. Hall, at St. Mary's Ont., has been burned. Loss, \$3,000.—The Evangeline hotel at Berwick, N. S., owned by G. E. Kirkpatrick, was burned to the ground on the 24th inst. The building was insured for \$1,200.—Wm. Cosgrove's carriage factory at Berlin, Ont., was destroyed by fire a few days ago. Loss about \$5,000; insurance, \$3,000.

CONTRACTS AWARDED.

NANAIMO, B. C.—The contract for the supply of sewer pipe has been awarded to the British Columbia Pottery Co.

SANDWICH, ONT.—The contract for repairing the county buildings here has been awarded to Patrick Nevin. Esti-

mated cost \$15,499, besides \$4,500 for a new residence for the jailer.

ST. CATHARINES, ONT.—The directors of the general hospital have awarded the contract for new additions to Newman Bros., for all the works.

BLENHEIM, ONT.—The Town Council have accepted the tender of George W. Collar for the erection of a town hall. Contract price, \$6,800.

WALLACEBURG, ONT.—The Town Council has disposed of \$16,000 of debentures to G. A. Stinson & Co., of Toronto, at the price of \$16,640.

QUEBEC, QUE.—C. E. Morinette has been awarded the contract for the new presbytery and the steeple of St. Catherine church in Portneuf county.

LONDON, ONT.—The Street Railway Co. have let the contract for a bridge across the river at Wellington street, to the Central Bridge Co., of Peterboro.

CHATHAM, ONT.—The contract for the construction of six iron bridges over the Raleigh Plains drain has been awarded to the Hamilton Bridge Co., at \$6,590. The spans run from 50 to 65 feet.

KINGSTON, ONT.—The City Council have awarded contracts as follows for water works supplies: lumber, Rathbun Company, \$13.75 per M feet; hardware, J. Corbett, \$248.74; tinsmithing, James A. Skinner

ST. HYACINTHE, QUE.—The contract for the erection of the branch bank for the Eastern Township bank has been let to Paquette & Godeau, of this town. The building is to be of red sandstone and Beebe plain granite. Messrs Clift & Pope, of Montreal, architects.

BROCKVILLE, ONT.—W. G. Tompkins, who was awarded the contract for repairs and additions to the Wall street Methodist church, has commenced the work. About 300 cords of stone, 7,000 bushels of sand, considerable heavy timber and a large quantity of lumber will be required.

COLLINGWOOD, ONT.—The contract for building a two-storey pressed brick house for E. S. Brown has been let to contractor Tourges.—The erection of a two-storey brick dwelling for Robt. Stephens, sr., has been given to Wilson Bros.; several other small contracts have been let recently.

FOREST, ONT.—Thomas Shay, of this town, has been awarded the contract for the following new buildings: A. Sparling, con. 10, Plympton, barn, 40x65; James Houston, 8th con., barn, 36x40; Albert Kemp, 12th con., brick residence, 22x32; Wm. Banting, Warwick, dwelling house, 18x28; John McLeod, Lake Shore, residence, 20x28.

WINNIPEG, MAN.—Tenders have been awarded for the improvements to the Cauchon block as follows: Brick work, carpentry, painting, plastering, etc., John Shaw & Co.; plumbing and hot water

heating, Plaxton & Co.; elevator and fire escapes, John McKechnie; total contract price, \$30,605.—A. C. Sutherland has received the contract for the erection of W. H. Culver's new residence, to be built on Edmonton street, south of Broadway. Mr. George Browne, architect.

HAMILTON, ONT.—The Board of Education have decided to accept design No. 2 for the Collegiate Institute and Ontario Normal School. This design provides for Credit Valley stone to the second storey. The following are the accepted tenders for the work: Brick and stonework, Geo. Webb, 56,144; carpenter work, Reid & Halliday, \$25,537; plastering, James McKee, \$3,745; electric work, Lowe & Farrell, \$1,325; cast iron work, R. G. Olmstead, \$1,783; slate boards, T. Irwin & Son, \$1,625; galvanized iron work, Irwin & Son, \$3,379; slate and tile work, Irwin & Son, \$3,888; steel structure work, Hamilton Bridge Works, \$1,850; steam heating, Fairley & Stewart, \$9,128; plumbing, W. J. Walsh, \$5,398; painting and glazing, K. J. Sculley, \$4,385; total, \$118,317.

MONTREAL, QUE.—A. C. Hutchison, architect, has awarded contracts as follows for a two-storey house on Mount Pleasant avenue for H. Watson. masonry, W. Oman; carpenter and joiner's work, James Shearer; roofing, Montreal Roofing Co.; plumbing, R. Mitchell; brick work, W. Lavers; plastering, James Morrison; painting and glazing, G. S. Kimber; iron work, Donaldson & Sons.—J. H. Macduff, architect, has awarded the following contracts. one store and dwellings, one cottage and five tenement buildings for Mr. J. B. Cazalais masonry, Bray and Guilbault, carpenter and joiner's work, Jos. Sinical, brickwork, Bonald mona & Deslauriers, plastering, Jos. Chamberlain; painting and glazing, J. B. Deschamps, plumbing, galvanized iron and slate roofing, Alp. Lacasse; gravel roofing, Bernier Bros.—W. McLea Wallbank, architect, has awarded contracts as follows. additions and alterations of building on St. Catherine street, for the estate Lyman: iron work, Dominion Bridge Co.; painting and glazing, G. S. Kimber; other trades, Simpson & Peel. Same architect has let the following contracts for alterations and additions of four stories, forming one dwelling and two stores, for E. K. Green: masonry, Mr. Lynch; carpenter and joiner's work, R. Neville; plumbing, R. Mitchell & Co.; brickwork, Mr. Lynch; iron work, Dominion Bridge Co.

BUSINESS NOTES.

Archambault & Therieu, plumbers, St. Hyacinthe, Que., have dissolved partnership.

Armand Guillet and Joseph Allard, painters, Montreal, have formed a partnership.

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BRIDGE BUILDERS

BELLEVILLE, ONT.

HINTS ON MEASURING PAINTERS' WORK.

Last month I mentioned the desirability of the painter making himself acquainted with architects' drawings. The subject is one that is somewhat difficult to certain people; on the other hand it often happens that some can comprehend the mysteries of "plans, elevations and sections" at a glance. However the painter may be situated in this respect, he should certainly not neglect to make himself fully acquainted at least with the elementary principles of the art of measuring from architects' drawings. He will probably be unable to put in a tender that will be accepted for new work if he is deficient in this respect. To be a good business man, or to be thoroughly acquainted with the trade, will not alone be sufficient.

When estimating on work to be executed "on the job," that is, on work where one has an opportunity of judging at sight the actual amount of labor to be performed, the best plan is to take a walk throughout the house to be dealt with, so as to gain an approximately accurate idea of what is to be done. It must not be expected that measurement will give all the information desired, because after all the cost of the actual number of feet to be painted will depend wholly upon the price fixed for each individual foot. Of course the value of painters' work depends very much upon the quality of the materials employed; in fact, to so great an extent is this the case that painters have no real methods of comparing prices, unless they also compare their materials, which, of course, would be a very unusual proceeding.

From what has been said, it will be known that after all it is a very difficult matter indeed to attempt to lay down any hard and fast rules for the measurement of painters' work. A few items of interest, however, may be added with advantage, e. g., a gallon of paint used with 6 pints raw linseed oil, 1 pint of boiled oil, 1 pint of turpentine, and 12 lbs. to 14 lbs. of dry paint will make about a gallon of ordinary paint, which will, when spread on stone or brick, cover from 25 to 30 superficial yards, and on wood from 50 to 78 yards. On compo. it will cover from 40 to 50 yards, while on a well-painted surface, such as iron, it will cover as much as 80 superficial yards.

Literature on the measurement of painters' work is very meagre. The Association of Master House Painters and Decorators, of the United States of America, prepared at considerable labour and cost some time since a book of measurements which is of the greatest value to all contracting painters. It was prepared as a labour of love by several members of the Association, but it is very

comprehensive in character and might well form the basis of a similar guide to the English trade. Of course, painting "on the other side" differs materially from that carried on here, because the construction of the buildings is different; yet the work in question is quite valuable to English readers.—Arthur S. Jennings, in Plumber and Decorator.

A MACHINE FOR SAWING OUT A TUNNEL.

An enterprising inventor in Calaveras is having built a machine by which he proposes to revolutionize the present methods of tunneling, the capacity of the device for "sawing out a tunnel," as claimed, being at the rate of twenty three feet a day. The apparatus is described as being twelve feet long, four feet wide, and six feet high, and, with the 14-horse power engine which runs it, weighs some 6300 pounds; the principle is that of a circular saw. Sixty drill points attached to each of two wheels, four feet in diameter and eight inches wide, make 600 revolutions per minute. The points are one-half an inch apart, every revolution feeding one-eighth of an inch, and the enthusiastic inventor declares that it will cut twenty feet of a six-by-eight tunnel in a day in the hardest rock. The latter, being crushed as fine as wheat grains, is carried to the rear and dumped in a car. The drill points weigh one-fourth of a pound each, last four days, and are kept cool by means of a steady stream of water. Three men are required to run the machine.

ENDURANCE OF WIRE ROPE.—A rope of Craddock's improved crucible steel, an inch in diameter, after fourteen years constant use, during which it was never repaired, though it has hauled 1,500,000 tons, has been taken out of a Nottingham colliery; another steel rope, 3,400 yards long and 2½ inches circumference, was used continually in a Sheffield colliery for eleven years and eight months; a third rope, 392 yards long and 5 inches round, was used on the under side of a drum, near Barnsley, for three years and ten months.

If you tender on a job in which the paint work is principally to be in parti tints, remember that you may lose over it should the owner of the house or the architect be very particular as to the tints required. The writer has known jobs where a foreman painter has been at work for a whole day endeavouring to find a suitable combination of colours for a single room, and often, after one has been decided upon, a change was ordered. The best plan is to have the colours that are required decided upon before the contract is signed, although this is not always practicable.

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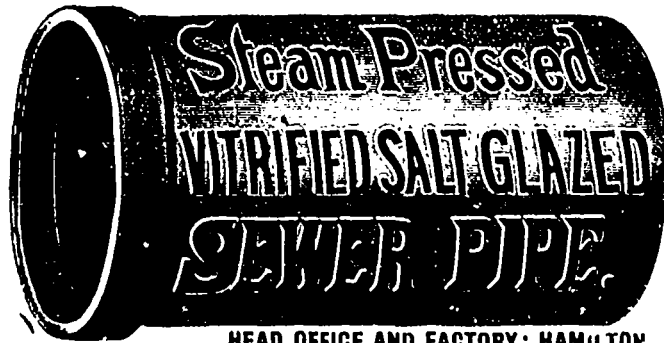
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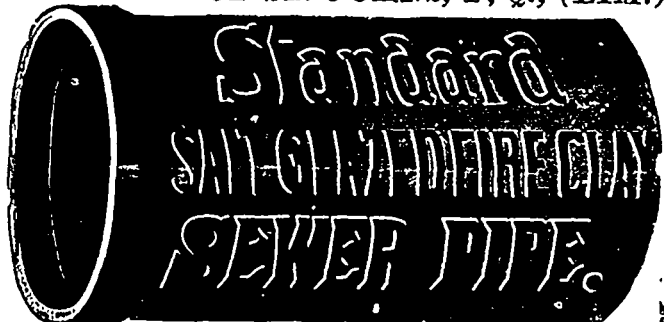
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MUNICIPAL DEPARTMENT

THE USE OF CONCRETE FOR BRIDGE FOUNDATIONS.*

By JOSEPH DE GURSE WINDSOR.

The great value of concrete as a substratum for stone masonry in foundations upon damp and yielding soils, and where foundations are built in water, has been universally recognized; but many engineers are now using concrete for the entire foundation of bridges, such as piers, bridge seats, copings, etc. When properly made it possesses the qualities of strength and hardness in an almost equal degree with the best stone masonry, and is superior to second-class masonry in these respects, while it has been known to stand the disintegrating effects of the atmosphere and the abrasion of running water much better than some of the harder specimens of stone.

The prejudice against the extensive use of concrete for foundations that so generally prevails has doubtless been due to failures caused by improper mixing and handling, or to lack of care in the selection and proportioning of the ingredients. In bridge foundations the concrete is composed of cement, either Native or Portland, and the aggregate, which is usually sand and broken stone or gravel.

Trautwine states that in a heap of stone piled loosely or in dry sharp sand the voids occupy from thirty to fifty per cent. of its mass. To get the best results from concrete the voids in the aggregate should be slightly more than filled. A proportion very generally recommended by text books is one volume of cement, three of sand and five of broken stone or gravel. But in most cases, and especially where the concrete is exposed, and is above the surface of the ground, I would recommend an increased quantity of cement.

Owing to the limited number of quarries in western Ontario, where suitable stone for bridge masonry can be procured, the owners practically control prices for such work, and in accordance with their likes and dislikes of the engineer employed, are tempted to fix the prices arbitrarily for stone masonry. I therefore believe that the engineers of Ontario owe it as a duty to their clients to study carefully the merits of properly made concrete, and to apply it in place of stone masonry wherever it is possible. If this practice was followed it would only be a short time before the owners of quarries would recognize the fact that strong competition lay within reach of every engineer. At present the price is at least thirty per cent. lower than the masonry. And if once convinced that it is as good for all practical purposes it should require no further argument to induce engineers to use it.

During the summer of 1895 I was requested to prepare plans and specifications for three steel viaduct bridges on the London and Port Stanley Railway.

No. 1, over Kettle Creek, consisted of fifteen plate-girder spans, each thirty-six feet in length, excepting the two end spans, which were twenty-eight feet in length, and one truss span of eighty-five feet over the creek. The girders rested on columns braced together transversally to form bents, each pair of which was braced together to form towers, the bents varying in height from sixteen to sixty-two feet.

No. 2 was over Mill Creek, south of St.

Thomas, similar to No. 1, but had no truss span.

No. 3 was over Zavitt's Pond, near Port Stanley, and has a total length of 228 feet.

The sub-structure for each of these bridges consisted of a masonry abutment at either end, and a pier of pedestal under each column. The abutments were composed of stone masonry to the depth of ten feet beneath the bridge seat, resting on a bed of concrete of sufficient depth to reach a hard clay foundation. Each of the pedestals was composed of concrete surmounted by a stone cap four feet by four feet by eighteen inches in depth, and pierced with two anchor bolts one and one-eighth inches in diameter, and four to five feet long.

I should have preferred to have dispensed with the stone cap, but had to give way somewhat to prevailing prejudice. The concrete pedestals varied in depth from five to nine and one-half feet, and were in the shape of a frustrum of a pyramid with a batter of one in six, the surface under the stone cap being three feet nine inches by three feet nine inches in all cases, except those on either side of Kettle Creek, which were larger, likewise the stone cap surmounting them.

The pedestals were made as follows: The ground was excavated to the required depth to reach a hard clay or gravel foundation, when a strong box having the required batter and proper dimensions was lowered into the excavation, securely braced and properly centered. The concrete, after being mixed, was shovelled into the box and rammed. As soon as sufficiently set, the box was removed, after which the concrete was kept wet for about a week, and until no further damage was anticipated from the outer layer drying too quickly, and robbing the mortar of moisture which is so essential to crystallization, after which a mortar bed composed of one part of cement to two parts of sharp sand was placed, of sufficient depth to receive the stone cap and bring it to the proper elevation.

The concrete used in the pedestals and beneath the stone abutments was composed of one part Portland cement, two parts of sand and three parts of broken stone. The cement specified for the work was Star Brand Napanee Portland, but on account of the great demand for this brand, the contractors, except in the case of the latter bridge, were unable to secure this cement, and imported brands were used.

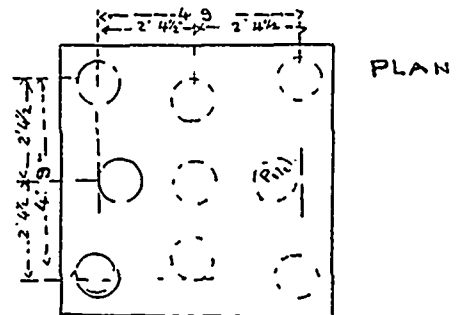
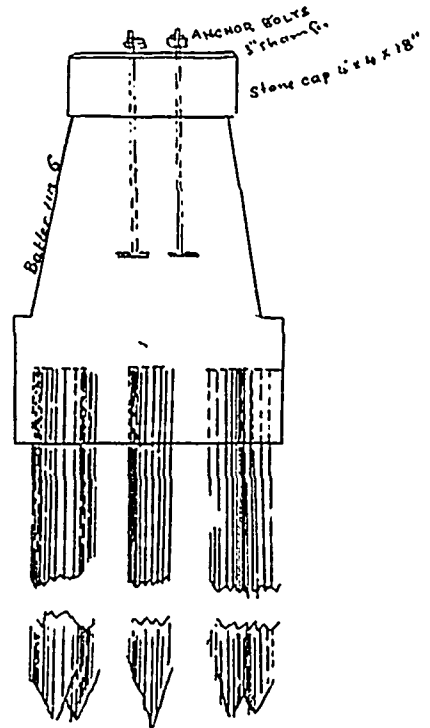
The specifications required: That there should not be more than 5% residue on a sieve of 10,000, and that the tensile strength at the end of 7 days, 1 day being in air, should be 350 lbs. per sq. inch; that the sand used should be clean, sharp, and on the coarse side free from loam, and of a silicious nature; that the stone should be good hard limestone, broken so as to pass through a two-inch ring, and just before being used shall be sprinkled with sufficient water to remove all dust and thoroughly wet the entire surface.

The mode of preparing the concrete was as follows: Two barrow-fuls of sand were spread evenly over a platform twelve feet by 12 feet. On this one barrel of cement was evenly spread, when the two were turned over at least three or four times while dry; enough water was then added to form a stiff paste. After being levelled the three barrels of broken stone were evenly spread over it, and repeatedly turned over until the ingredients were thoroughly incorporated. It was then put in place as quickly as possible and evenly and sufficiently rammed.

In bridge No. 3, six of the pedestals were found over quick-sand foundation, and with these I proceeded as follows: I procured nine piles of sufficient length and spaced as per annexed sketch for each pedestal, and then driven to a refusal with

a 2,000 pound hammer, and sawed off two feet between the surface of the ground. Instead of following the more general practice of capping and flooring, I had the soil excavated from two to three feet below the top of piles, and had the con-

ELEVATION



crete rammed between, around and on top of the piles until sufficient height had been obtained to receive the cap stone. By this method the bearing power of the soil between the piles was utilized, as well as the bearing power of the piles themselves, and the whole formed a monolithic mass which cannot fail in part.

With reference to the durability and resistance of concrete to abrasion, I may refer you to a paper by C. D. Purdon, M. Am. Soc. C. E., in Engineering News, Vol. 19, page 443, where the writer, after referring to the mode in which the concrete piers were built, adds:

"On May 7th I had an opportunity of inspecting them after a most extraordinary flood in the river, caused by a water spout, in which flood the river rose one and four-tenth feet above the highest water known, the current being estimated at from eight to nine miles per hour, with large quantities of drift running. Among the drift were cotton wood trees, two feet to three feet in diameter, many of which, I am informed, broke on the piers from the force of the current. No damage whatever was done to the piers and no greater marks left by the drift than could be made by a stick held in the hand and dragged across the surface.

It was the opinion of the bridge inspectors of the St. Louis and San Francisco Railroad who watched the bridge during the flood, and who were men of considerable experience, that had the piers been built of masonry of such stone as could have been obtained, they would not have been able to withstand the drift and the bridge would have been destroyed."

*Paper read at the last annual meeting of the Association of Ontario Land Surveyors.

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CONDITION OF THE MARKET.

TORONTO: Enquiries for builders' supplies have been few during the past week, orders being placed in a restricted manner. A slight improvement is to note in plumbers' supplies, while in glass trade from stock shows a slight increase. Other lines are marked by the same quietude which has prevailed for some time.

MONTREAL: Enquiries for cement for spring and future delivery have come to hand within the past few days, but little actual business has been done. The prospects for building are slightly improving, and may develop considerably as the season advances.

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Table listing prices for slating nails.

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Table listing prices for common barrel nails.

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