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CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL OF MUNICIPAL 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.

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No. 42.

THE CANADIAN CONTRACT RECORD,

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TENDERS

FOR

ELECTRIC LIGHTING



Tenders addressed to the Chairman of the Board of Control, City Hall, Toronto, will be received through registered post up to NOON ON WEDNESDAY, NOVEMBER 25TH, 1896, for wiring and supplying the necessary electric fixtures for lighting the Pavilion, Horticultural Gardens.

Specifications may be seen, and all information obtained, at the office of the Park Commissioner, Toronto. Each and every tender must be accompanied by a marked cheque, made payable to the order of the City Treasurer, or a cash deposit equal to 5 per cent of the amount of the tender, which deposit will be forfeited to the city in the event of the party whose tender is accepted failing to execute the necessary contract and bond.

The deposits of unsuccessful tenderers will be returned.

The lowest or any tender not necessarily accepted.

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

City Hall, Toronto, Nov. 14, 1896.

CONTRACTS OPEN.

GRETNA, MAN.—A new Roman Catholic church will be erected here.

PARKHILL, ONT.—Robinson Bros.' saw mill was wrecked by a boiler explosion.

BUCKINGHAM, QUE.—Ross Bros. propose erecting new saw mills, at a cost of \$50,000.

RENFREW, ONT.—The North Renfrew Agricultural Society will build a large exhibition hall.

ST. MARY'S ONT.—A site will be chosen at once for the proposed power house for the electric plant.

EMBRO, ONT.—An attempt is being made to secure the installation of an electric light plant here.

STREETSVILLE, ONT.—W. J. Penny, clerk, will receive tenders until the 21st inst. for constructing two water tanks.

FREDERICTON, N. B.—The Provincial government are inviting tenders for the purchase of \$40,000 of 4 per cent. bonds.

THREE RIVERS, QUE.—The Nuns of the Community of the Precious Blood will build a new convent here next spring.

CUMMING'S BRIDGE, ONT.—There is talk of building an electric road from Hurdman's Bridge to Morrisburg through Metcalfe.

ST. JEROME, QUE.—The ratepayers have carried a by-law to grant \$50,000 to the Boston Rubber Co. to establish their works here.

DEPOT BAY, ONT.—The promoters of the Ottawa, Arnprior & Parry Sound railway will shortly commence the con-

SMELTING WORKS

City of Nanaimo British Columbia

BEING prepared to aid the construction of a Smelter, the City of Nanaimo invites correspondence in reference to the erection of Smelting Works in Nanaimo.

This City, with its Excellent Harbor, is centrally and favorably situated in regard to the quartz ledges of Alberni, Texada and Nanaimo Lakes; also the extensive coal fields and beds of iron ore, with cheap modes of transportation.

Further details furnished on application.

Adam Thompson,
City Clerk.

struction of extensive docks and elevators at this point.

HUNTSVILLE, ONT.—At a recent meeting of the authorities of the Presbyterian church a site for the proposed new edifice was selected.

RIVER DU LOUP, QUE.—The local government will rebuild the wooden bridge over the River du Loup, in the parish of St. George.

NEW WESTMINSTER, B. C.—The Reid & Currie Iron Works Co. have purchased a site on Columbia street and will erect a large building thereon.

CHATHAM, ONT.—A special committee of the City Council has presented a report in favor of sinking a test well for gas, at a cost of \$2,000.

SHAWVILLE, QUE.—An electric light plant will likely be installed here. The town has offered the company twenty years' exemption from taxation.

ST. ANDREWS, N. B.—A project is on foot to erect wharves and other necessary facilities as are required to enable this port to be utilized as a shipping port.

PAKENHAM, ONT.—Plans have been prepared for a new building for St. Andrew's church congregation, and tenders for construction will shortly be asked.

MAGOG, QUE.—The new building proposed to be erected by A. G. Dolloff will be a three storey structure, 70x65 feet, built of granite, brick and wood, and will cost \$6,000.

BROCKVILLE, ONT.—Proposals for the purchase of \$20,000 of county debentures, payable in twenty years and bearing interest at 4 per cent., are invited by Wm. Richardson, county clerk, until the 24th inst.

LETHBRIDGE, N. W. T.—Notice has been given of application for the incorporation of the Crow's Nest Pass Railway Company, for the purpose of constructing a railway from Lethbridge through to Roseland, B. C.

CORNWALL, ONT.—The plans of the proposed general hospital have been received and will be forwarded to Toronto for the approval of the Inspector of Public Charities, after which tenders for erection will be invited.

MONCTON, N. B.—Tenders are invited by D. Pottinger, general manager Intercolonial Railway, until Monday, the 30th inst., for the supply of ties, switch ties and fence posts required by the road.

SOREL, QUE.—A deputation from this town recently submitted a proposition to the Dominion government for the building of that portion of the Atlantic & Lake Superior railway from Montreal along the south shore of the St. Lawrence to Quebec.

MINDEN, ONT.—The Minden & Northwestern Railway Co. will seek authority from the Dominion government to build a railway from Irondale Junction to Minden, thence through Anson and Linford townships and southerly parts of Muskoka.

NANAIMO, B. C.—Attention is directed to the announcement appearing on front page of this issue of the CONTRACT RECORD, in which the corporation of the city of Nanaimo announces its willingness to aid the construction of a smelter in this city.

BELLEVILLE, ONT.—Col. Lazier and Mr. Hurley, M. P., interviewed the Minister of Railways and Canals at Ottawa, requesting a subsidy of \$3,200 per mile for that portion of the Belleville and Nipissing railway between Belleville and Tweed.

WINNIPEG, MAN.—The council has under consideration the question of establishing an electric light plant, at a cost of \$375,000, and also the construction of a waterworks system, the cost of which has been estimated at \$650,000. By laws to provide the necessary funds will be submitted to the ratepayers.

SPRINGHILL, N. S.—The Town Council is considering the question of providing a water supply. Professor Butler's report recommending a gravitation system has been favorably reported upon. The proposed system will necessitate an expenditure of from \$100,000 to \$150,000, which amount the ratepayers will be asked to provide.

WELLESLEY, ONT.—Mr. J. D. Moore, M. P. P., and Mr. Wm. Morton, of this town, recently interviewed the Ontario Cabinet regarding the improvement to the waterways connecting Lake Wahnapiatae and Lake Matagamashung. A charter was granted for the work some time ago, but it was never carried out. It is now proposed to undertake the improvements.

NORWICH, ONT.—Mr. Graham has made a proposition to the town council to install an electric light plant. Should he be given the privilege a suitable building will be erected at once.—Tenders for electric street lighting by incandescent lamps for a period of three years are invited until Friday, the 27th inst. For particulars apply to J. G. Hogarth, Reeve.

HAMILTON, ONT.—School section No. 6, Barton Township, will erect a new school building.—The following building permits have been granted: E. B. Patterson, two-storey brick dwelling on Hess street south, for J. McWalter, cost \$1,300; F. Slater, two storey brick dwelling on Blyth street, cost \$1,400; James Holbrook, pair two-storey frame dwellings on Gibson avenue, cost \$1,900.

KINGSTON, ONT.—At the municipal elections in January the electors will be asked to grant a bonus of \$25,000 for the erection of a grain elevator in this city.—It has been decided to erect a blast furnace and cyanide plant in connection with the School of Mines. The blast furnace will be located in a separate building contiguous to the stamp mill, and will be capable of smelting five tons of ore daily.

STRATFORD, ONT.—Proposals will be received by Wm. Davidson, County Clerk, until the 1st of December, for the purchase of \$15,000 of debentures, bearing interest at four per cent.—The City has before it for its consideration a plan of sewage disposal, known as the International System, which it is supposed will be adopted, and which includes the Candy sewage tank. A by-law to provide \$20,000 will be submitted to the ratepayers on the first of January.

BRANTFORD, ONT.—The Anchor Wire Fence Co. of Canada is seeking incorporation, to manufacture fences, gates, etc. The capital stock is \$50,000.—Some time ago a charter was obtained for the construction of an electric railway from Brantford to Galt and Port Dover, but the scheme was never proceeded with. It is now proposed, however, to undertake the work. The distance is about 15 miles. Among those interested are Mayor Elliott and Dr. Secord, of Brantford, and Henry Stroud, of Paris.

VICTORIA, B. C.—Mr. T. C. Sorby has submitted a comprehensive scheme to the Board of Trade for the improvement of the harbor. The total cost of the work below the railway bridge would be \$3,000,000, and in the upper harbor \$750,000. A meeting of the board will shortly be held to take action in the matter.—The City Engineer has estimated the cost of a steel bridge at Point Ellice, 40 feet wide, with three spans of 217 feet each, on masonry piers, at \$125,000.

ST. JOHN, N. B.—Tenders for the excavating for a building forty-five by ninety feet are now being received. Specifications at the office of H. H. Pickett, solicitor.—It is the intention of C. V. Boss, of New London, Conn., to erect a large biscuit and cracker factory in this city, a site for which was purchased last week. The building will be a three

storey structure, 45x90 feet. A meeting of the militia officers was held in this city last week to take action regarding the erection of a new drill shed. A committee will report on the matter again at a meeting to be held at an early date.—Another collapse in connection with the harbor improvements now going on has occurred. The total loss will be in the neighborhood of \$100,000.

OTTAWA, ONT.—A proposal will likely be made to submit another scheme for a drainage system, with an eastern outlet, to the ratepayers in January.—Steps will be taken at an early date to provide a new club house for the Capital Amateur Athletic Association.—The Ottawa & Gatineau Valley Railway Company have requested an extension of time in which to commence the construction of the inter-provincial bridge across the Ottawa river. For this purpose the city have offered a subsidy of \$150,000.—The construction of freight sheds for the Ottawa, Arnprior and Parry Sound railway will be commenced at an early date. It is proposed to build a covered trestle work across the basin.—It is the intention of the members of the Congregational church on Elgin street to erect a new edifice.

LONDON, ONT.—Mr. Matthews, architect, has been instructed by the Board of Education to prepare plans for improving the heating at the Collegiate Institute and Rectory street school.—Messrs. Robinson, Little & Co. propose building a large extension in the rear of their warehouse on Richmond street.—Tenders for the purchase of \$20,500 of consolidated debentures are invited until noon on Wednesday, the 2nd of December. Address, A. M. McEvoy, treasurer.—The specifications for the sewerage system have been adopted, and tenders for section "C" will be invited at once. This section comprises the sewer on Beecher street and Evergreen avenue, South London, the average cutting for which will be twenty feet.—A movement is on foot in this city to erect a large five-storey hotel opposite the Tecumseh House.

QUEBEC, QUE.—The promoters of the proposed bridge across the St. Lawrence river are actively engaged in furthering the scheme. In response to a request for a bonus from the local government, Mr. Flynn informed the deputation that three months ago he had instructed Mr. Gauvin, C. E., to report upon the project, and the report and his own recommendation in favor of the bridge would appear in his report as Minister of Public Works.—A company is in process of formation for the purpose of purchasing the Exchange Building. It is probable that the old building will be torn down and a large modern block erected on the site thereof. Honorable R. R. Dobell is said to be one of the promoters.—The city has been asked for a free grant of land at the Palais for the erection of a church and presbytery.—At a meeting of the Marine Underwriters' Association the secretary was instructed to urge upon the Dominion Government the advisability of extending the grading dock during the coming winter.

TORONTO, ONT.—A by-law will be submitted to the ratepayers to provide the sum of \$275,000 for the completion of the new city hall and court house.—At the monthly meeting of the Board of Management of the House of Industry, in answer to an enquiry from Mr. H. T. Ince, it was stated that plans for the proposed new building were now in course of preparation, and the work would be proceeded with at once.—The City Engineer has been asked to report on the proposal to construct an asphalt pavement on Wellington street, between Yonge and Bay streets.—Dr. Sheard has made an examination of the Fort Rouille and Dufferin street sewers, and reports in favor of ex-

tending them further into the lake. He advises that the former be carried eighty feet further out, and the latter as far as the end of the wharf.—The Board of Control has ordered a by-law to be prepared for submission to the ratepayers, providing the sum of \$26,000 to lay a 12 inch water main on Front street.—The City Council has ordered that repairs be made to Dundas street, from Bloor to Humber-side, at a cost of \$1,500, and to Lake Shore road, at a cost of \$1,500.—Building permits have been granted as follows: Geo. Foy, 3 storey bk. hotel, s. w. corner Queen and Sherbourne sts., cost \$6,000; Drs. McKenzie and Galloway, 2 storey bk. office, 14 Bloor st. e., cost \$4,000; W. G. Harris, two-storey bk. add. and bk. case present front of factory, 25 William street, cost \$4,000.

MONTREAL, QUE.—The City Council has given notice of its intention to construct a sewer on Plymouth road, from the end of the existing sewer westward to Gaudry street.—Mr. Alex. Scott has purchased property on St. Catharines street west, adjoining Ogilvy's store, and will commence at once the erection of a building to be used as a catering establishment.—The Montreal Amateur Athletic Association have resolved to build a new club house, and the directors have decided to offer premiums for plans for a building to cost about \$100,000.—At a meeting of the Fire Committee held on Monday last, a report was presented by the chairman recommending the erection of several new fire stations, as follows: One on Craig street, to cost \$60,000; one in St. Lawrence ward; one in the East End, to replace No. 7, to cost \$30,000; one on Frontenac street, to cost \$20,000; one in the northern part of St. Denis ward, and a small structure to accommodate a fire engine, a chemical and hose reel, to cost \$10,000; and one in the vicinity of Richmond and William streets, to replace No. 12, to cost \$30,000.—J. H. Macduff, architect, is calling for tenders for two stores and two tenements, three stories, at the corner of Greene avenue and St. Catharine street.—C. St. Jean, architect, is also calling for tenders for a church to be erected at St. Jerome, Terrebonne county.—Building permits have been granted as follows. One house on Peel street, for Alex. Walker; two-storey house, two tenements, brick front, on Lasalle street, for Wilfred Leonard; masonry, contractor, Duroches Bros.

FIRES.

The iron foundry of H. R. Ives & Co., Montreal, has been damaged by fire to the extent of \$5,000.—Dr. J. B. Oliver's residence and surgery at Newtonville, Ont., was burned on Monday last.—The residence of Francis Waldron, at Newcastle, Ont., was destroyed by fire recently. The loss is heavy.—A frame building at Madoc, Ont., owned by A. B. Ross, was burned on the 13th inst. Insurance \$1,200.—The evaporating plant of T. A. Harrison at Napance, Ont., together with a frame building, was burned on the 13th inst. The machinery was valued at \$1,500 and was partially insured.—The Royal Hotel at Wolfville, N. S., owned by J. W. Backwith, was recently gutted by fire. The loss is covered by an insurance of \$3,000.—H. Poyer's shingle and grist mill at Manotick Station, Ont., has been burned. Rebuilding will be commenced at once.—The large manufactory of D. Hibner at Berlin, Ont., was burned to the ground last week. The loss is about \$50,000, partially covered by insurance.

CONTRACTS AWARDED.

DESERONTO, ONT.—The Rathbun company have been awarded the contract for pews for the new R. C. church.

OTTAWA ONT.—Tenders for the sup-

ply of syenite were received as follows: Canadian Granite Co., \$9.00 per toise for unbroken and \$13.50 for broken; Foley & Co., \$9.75 and \$14.50.

QUEBEC, QUE.—The following tenders were received for heating apparatus at Parent Park: Vaudry & Matte, \$1,150; G. Simard & Co., \$935.00; J. Maguire, \$1,085; O. Pickard, \$1,350; Charles Bezin, \$749.00 (accepted).

GODERICH, ONT.—Twenty tenders were received for the construction of sewers. The contract has been awarded to C. A. Humber, of this town, and E. A. Cawsey, of Stratford, the figure being in the neighborhood of \$10,000.

LONDON, ONT.—Geo. Craddock, architect, has let contracts for four houses as follows: carpentry, John Taylor; brick-work, Wm. Martyn; plastering, Gould & Stratford; painting, Henry Spicer; plumbing, L. C. Hunt; heating, James Thompson.

TORONTO, ONT.—W. J. Burroughs & Co. are supplying the hot water heating apparatus for the residence of J. Grant, Woodville, Ont. This firm are also putting in plumbing in six houses on Monroe street owned by the North American Life Insurance Co.—Tenders for heating, plumbing, gas fittings, etc., for the new court house were opened last week. For the whole work six tenders were received as follows: \$198,032, \$190,120, \$187,985, \$191,950, \$208,000 and \$211,000; for the plumbing work, \$60,493, \$47,000 and \$44,000, for the galvanized iron work, \$9,305, \$10,662 and \$9,980. The tender of \$187,985, which was from the Bennett & Wright Co., has been recommended for acceptance.

BUSINESS NOTES.

The assets of Drapeau, Savignac & Co. plumbers, Montreal, will be sold by tender.

Argall & Co., paint manufacturers, Three Rivers, Que., have formed a new partnership.

The dissolution is announced of I. Charbonneau & Co., sash and door factory, St. Louis du Mile End, Que.

A demand of assignment is said to have been made on A. D. Turcotte, planing mill proprietor, of Montreal.

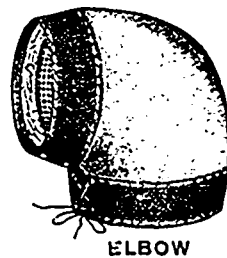
FLOOR TEST FOR FIRE AND WATER RESISTANCE.

Through the efforts of Mr. Howard Constable and under the direction of the Department of Buildings, of New York City, a very practical and thorough test was recently made, by which the fire and water-resisting qualities of standard terra cotta as fireproofing for floors was demonstrated.

A rectangular building 12 by 15 feet by 10 feet high in the clear was erected of common brick, with two flues or chimneys and an opening on one side to which iron doors were attached. The floor or ceiling was constructed of iron beams enclosed in terra cotta. At 9 a.m. fire was started and kept in full operation for six hours, during which time the heat registered from 2,000 to 2,200 degrees, and during the last hour or so was sufficient to melt cast iron. At 1 p. m. water was turned onto the building from a regular fire engine at a pressure of 50 pounds to the square inch, after which a load of 600 pounds to the sq. ft. was applied. At 2 p. m. fire was started on top of floor and allowed to burn fiercely for one hour, when water was turned on from fire engine under pressure of 60 pounds to square inch and allowed to play for ten minutes. The result of this test shows that this kind of floor has great resisting capacity when properly laid, both against an intense heat and against water from fire hose under pressure. Some of the lower portion of tile was broken off by the force of the water, but there was no break through the floor. There was a deflection in the floor of an inch or more during the progress of the fire, but it went back three-quarters of an inch when water was applied.

CONSTRUCTING A SOLID FOUNDATION.

A new way of constructing a solid foundation for a tall building has been tried with success in Berlin. It was necessary to find a solid base sufficiently strong to carry a building weighing more than 10,000 tons. The plot of ground upon which the building was to stand was adjoined on both sides by high buildings which rendered unsafe the digging to any depth for a foundation. The only way out of the difficulty was the sinking of a caisson in the centre of the plot, upon the cemented top of which a hollow form of cement was built. Into this form molten iron was poured, filling up the space, and upon this cast-iron foundation plate the understructure of the building now rests, while the side walls are supported by a cantilever structure. The full weight of the load upon the cast-iron foundation is estimated at more than 20,000 tons.



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CEMENT AFFECTED BY FREEZING.

It appears to be ascertained as a fact, based on more than six thousand recorded results, that Portland cement mortar suffers no surface disintegration under any condition of freezing, but that in most cases its strength is reduced, in some cases by as much as forty per cent. Rosendale cement is disintegrated when exposed to frost while setting, and its cohesion may be entirely destroyed by immersion in water, which becomes frozen around it. Salt water prevents this disintegration to a large extent, but seems to have an injurious effect upon the strength, and the cement below the disintegrated surface is stated to be increased in strength when the Rosendale cement is used. A mixture of a natural rock cement and of Portland cement is found to give very satisfactory results, as its surface does not disintegrate, and its strength is increased by the freezing. Portland cement is injured less proportionately as the percentage of the cement in the samples is reduced. Again, though lime mortar is ruined by alternate thawing and freezing, fairly good results may be looked for in the case of brick masonry when the mortar is kept frozen for some time after laying.—The Railway Review.

A striking instance of the durability of timber, under certain conditions, was afforded during the excavation for the foundation of the Bowling Green building, New York City. A line of spruce piles was discovered at some distance below the surface of the ground, which were placed in position about 150 years. These piles, upon examination, were found to be perfectly sound, and to all appearances would have been just as sound and good 150 years hence.

Sleepers embedded to the top either in concrete or sandy soil, and covered with a floor, will soon rot. If embedded only three-fourths of an inch, they will last long, and, if only laid on concrete, longer still, but in this case it is not easy to get them firmly embedded on the more

or less uneven surface of the concrete. The best plan we know of in such cases is to lay first on the concrete spruce strips one inch thick, and four or five inches wide, which have been well dried, and thoroughly coated all over with tar. The sleepers are then laid across these strips, at right angles with them, and the boarding nailed to the sleepers, and holes bored, a few inches apart, through the flooring, around the sides of the room. In this way a circulation of air is maintained in all directions under the floor. If the tarred strips are not more than two feet apart, the sleepers may be two inches thick. As to the spring of the floor, everything would depend on the span of

the beams or sleepers. It is an easy matter to calculate the deflection for any given case.

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MUNICIPAL DEPARTMENT

ROAD CONSTRUCTION.

Mr. A. W. Campbell, Provincial Instructor in Road-Making, has issued Bulletin No. 2, containing much valuable information on the methods of constructing public highways, from which we take the following :

ROAD DRAINAGE.

The most frequent cause of bad roads in Ontario is lack of drainage. When a road is good during the summer months but scarcely passable in spring and fall, the plain inference is that, if it could be kept dry it would be good the whole of the year. In a couple of months of spring and fall, roads, otherwise good roads, because of insufficient drainage, are destroyed more than in all of the remaining ten months of the year. Because of neglect in the simple matter, road labor and expenditure is very largely wasted. No farmer or business man can conduct his personal affairs in such a manner without failure.

Excavations called "drains" are, it is true, made at the side of the road, but frequently are not provided with outlets, or the outlets are allowed to speedily fill up. From these receptacles, water soaks in and softens the foundation of the road. Loose dirt from this "drain" is piled in the centre of the road. This is soon roughened and tracked so as to hold water on the surface until it penetrates into the roadbed, producing puch-holes—and actions against the municipality for damages. Under-drainage is seldom thought of to carry the water away from the foundation. The object of our road-makers appears to be to cover the water with gravel or crushed stone, a tedious and costly process. A road must have a firm foundation obtained by drainage, since it is the natural soil which must support not merely the road metal but the traffic also. Strength in a roadbed must be had not so much in the road covering as in the natural soil beneath it.

Under-drainage is as necessary as surface drainage. A dry foundation is more necessary than a dry surface. Under-drains are needed not as much to carry away the water which falls on the surface of the road as to interrupt the water rising in the saturated earth from the impenetrable stratas beneath, "to lower the water line." Common field tile should be used three or four inches in diameter, hard, well-burned, and unwarped, every care being taken to lay it in the trench with a constant fall to a free outlet. Usually it is best to lay two tile drains, one on each side of the road, about two and a half or three feet below the bottom of the open drains. Thus placed, they may be used as outlets for the surface drains if better cannot be

obtained, proper catch-basins being provided. Lay the tile to an even and uniform grade and make the joints close. It is a good practice to cover the joint with sod, grass side down. A coating of straw is good in quick or running sand, but it is much better to completely surround the tile with sawdust.

A perfect system of drainage is obtained by surface and tile drainage. The surface of the road must be sufficiently rounded or crowned in the centre to shed the water readily to the side ditches or gutters. The water in its course to the gutters must not be impeded or held by hollows tracks or ruts in the roadway. The gutters must be carried to a free outlet as often as possible having a good fall.

It is bad practice to carry water long distances and pour it over hills by the road side. Deep and dangerous gulches are thus created. This water before reaching the hill should, if possible, be carried through adjoining property to an outlet. Roads along sidehills should have a tile drain and an open gutter along the inner side of the roadway, and the trench containing the tile should be filled with gravel, broken stone, or other porous material to intercept the soakage water from the uplying land. On hills the course of the water may be arrested in the open drains at short intervals and caused to enter the tile through catch-basins, thus over-covering the wash of excessive and rapid flows of surface water. The traffic of winter often forms a channel for the water in the centre of the road, and in the spring before frost leaves the surface of the road the pathmaster should examine every hill and see that the gutters are free from obstruction of snow and ice. If this is neglected, constant and expensive repairs will be necessary.

Water in "springy" places on a roadbed should be conducted by drains from the centre of the road diagonally to the side under-drains. Springy places on a hillside embankment should also be tapped by a blind drain, and the water led quickly to the tile drains.

Take the water out and keep the water out.

CULVERTS.

Small culverts should be made of vitrified or concrete tile, or iron pipe. Stone masonry is the best material for larger culverts. There is a tendency in some municipalities to narrow waterways across road allowances by the use of embankments. This practice, while formerly adapted to the conditions of the climate in Ontario, has become very objectionable since the land has become cleared of its timber, and extensive drainage works have been constructed. Subjected as we are to severe floods and freshets unrestrained by timbered land and augmented by large drains, every facility should be offered to the flow of water. Large expenditures have been created by washouts caused by contracted waterways under bridges and culverts, an extravagant method of lessening the original cost.

BRIDGES.

Iron and steel are rapidly increasing in favor as bridge materials, replacing wood to a very great extent. The former are constantly decreasing in cost while the value of wood is increasing. There are, however, sections of the province where wood is still plentiful and where, notwithstanding the greater durability of steel, economy dictates its use. The selection of any particular form of bridge must be controlled by the adaptability to location and economy, since no one of the well-recognized types of bridges, whether beam-truss, suspension-truss, or arch-truss is better than another. Any bridge designed on correct principles is good.

ROAD MACHINERY.

In every branch of manufacture, industry and construction, the need of proper machinery is felt, and wherever it is used the economy is recognized. Labor saving machinery as such at one time received very much opposition, but to-day all invention and improvement in this regard is received eagerly.

The most important varieties of road machinery are rollers, graders, and stone-crushers. The last mentioned of these, the stone-crushers, are almost indispensable in localities where gravel is not obtainable, and where field stone or bed rock are to be had. They are also valuable in localities where the gravel is coarse or where, while gravel is obtainable, macadam roads are needed and may be constructed from stone in the immediate vicinity. A screen attachment is very useful in coursing the metal, and, in gravel, in removing sand and earthy matter.

Graders are needed in every township and have about the same relation to roadwork that the self-binder has to the harvest field. Work can be done by them much better and more economically than by hand labor. A great portion of the successful use of a grader depends on the operator. He should be instructed in its proper management, should be capable of handling it in a workmanlike manner, and of following any instructions given him, and his services should always be employed when the machine is used. He should know also the proper way of shaping a roadbed, since the machine of itself has no knowledge of roadmaking, and unless the operator has, satisfactory results can hardly be expected.

Henry R. Lordly, C. E., consulting hydraulic engineer, is engaged preparing plans for a novel system of raising water to the reservoir at Yarmouth, N. S. The Rife hydraulic rams or engines are to be used, which engines are worked by the power of the water obtained from the mains. The same amount of water will be used over again to work three engines and nearly a million gallons per day will be raised. The whole plant will cost less than half of steam driven engines, and the cost of running is trifling. Yarmouth will have the most economic pumping system in the country. Mr. Lordly is acting for the Caledonian Iron Co., Montreal, the makers of these hydraulic engines for Canada.

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Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: Small supplies for the building trade are in fair demand, but as few new buildings are being commenced, the call is principally for such lines as are required for finishing contracts. Cut nails are moving freer, also the heavy metal goods. In galvanized iron an advance has taken place of from 20 to 30 cents per 100 lbs., and the demand is improving. Business in plate glass and paints and oils is moderate.

MONTREAL: Only a very moderate demand exists for builders' supplies, although trade as a whole shows a slight improvement. Considerable is doing in repair work. Nails are selling well in small lots. Pig iron is dull, but the Hamilton article appears to be gaining in favor. A small jobbing demand is reported for galvanized iron. Cement is holding firm, and small lots are inquired for freely. A sale of 700 barrels is announced on western account at \$1.95. Firebricks are selling at \$16 to \$21.

LUMBER.

CAR OR CARGO LOTS.

Table with columns for Toronto and Montreal prices for various lumber types including clear picks, mill run, spruce culls, and various siding materials.

VAID QUOTATIONS.

Table listing various mill cull boards, shipping cull boards, hemlock scantling, and other lumber products with their respective prices.

Toronto. Montreal.

BRICK—M

Table listing prices for various types of bricks including Common Walling, Good Facing, Sewer, Pressed Brick, and others.

SAND.

Table listing prices for sand per load of 1 1/2 cubic yards.

STONE.

Table listing prices for various types of stone including Common Rubble, Large flat Rubble, Foundation Blocks, Kent Freestone, and others.

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

Table listing prices for Ohio Freestone products such as Buff Promiscuous, Blue Dimension, and Sawed Ashlar.

SLATE.

Table listing prices for various types of slate including Roofing, Terra Cotta Tile, and Ornamental Black Slate.

PAINTS. (In oil, 1/2 lb.)

Table listing prices for various types of paint including White lead, Red lead, Yellow ochre, and others.

Toronto. Montreal.

CEMENT, LIME, etc.

Table listing prices for various types of cement and lime including Portland Cements, Hydraulic Cements, and others.

HARDWARE.

Table listing prices for various hardware items including Cut nails, Steel wire nails, Iron pipe, and Structural Iron.