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CANADIAN CONTRACT RECORD

A Weekly Journal of Advance Information and Public Works.

ITS PURPOSE: TO SUPPLY TO CONTRACTORS ADVANCE INFORMATION RESPECTING CONTRACTS OPEN TO TENDER, AND TO ARCHITECTS, ENGINEERS, MUNICIPAL AND OTHER CORPORATIONS, A DIRECT MEDIUM OF COMMUNICATION WITH CONTRACTORS.

ITS MERIT: ECONOMICAL AND EFFECTIVE SERVICE.

Vol. 2.

Toronto and Montreal, Canada, March 7, 1891.

No. 4

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A Weekly Journal of Advance Information and Public Works,

PUBLISHED EVERY SATURDAY

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Information from any part of the Dominion regarding contracts open to tender, sent exclusively to this journal for publication, and not elsewhere published, will be liberally paid for.

ADVERTISING RATES ON APPLICATION.

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

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

The publisher of the "Canadian Contract Record" desires to ensure the regular and prompt delivery of this Journal to every subscriber, and requests that any cause of complaint in this particular be reported at once to the office of publication. Subscribers who may change their address should also give prompt notice of same, and in doing so, should give both old and new address.

TO CONTRACTORS.

Tenders will be received at the office of the undersigned until noon SATURDAY, MARCH 14TH, for the several works required in the erection of proposed Additions to St. Simon's Church, Toronto.

Lowest or any tender not necessarily accepted.

STRICKLAND & SYMONS, Architects,
18 Toronto Street.

TENDERS.

Local Improvements—Eglinton Avenue.

Tenders will be received by the undersigned for the Corporations of North Toronto and York Township, for Grading, Macadamising, Bridging, &c., on Eglinton Ave., between Yonge Street and Forest Hill Road. Plans, specifications, &c., can be seen and tenders received at office of undersigned up to SATURDAY, MARCH 21ST, 1891, at 5 p.m. The lowest or any tender not necessarily accepted.

PETER S. GIBSON, C.E. & P.L.S.,
Engineer for Corporation.

Willowdale, March, 1891.

TO ARCHITECTS.

Office and good-will for sale, or will take partner; city. For full particulars, address "R. A." care CANADIAN ARCHITECT AND BUILDER.

TO BUILDERS.

Tenders will be received by the undersigned till noon on Saturday, 14th instant, for the Mason, Carpenter, Iron, Felt Roofing and Painters' Work of a Factory Building on Adelaide st., near York. LANGLEY & BURKE, Architects,
Canada Life Building.

TENDERS

Required for building BRICK WORKSHOPS at the Boys' Industrial School, Mimico, before noon on Saturday, 14th March.

No tender necessarily accepted.

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

TO CONTRACTORS.

Sealed tenders will be received at the offices of the undersigned architects until noon of the 16TH MARCH, for all trades required in the erection of NEW PHYSICS BUILDING at McGill College, Montreal. Each contractor must be prepared to provide, if called upon, two approved sureties to the full amount of his contract. It is not guaranteed that the lowest or any tender will be accepted. Plans and specifications may be seen on and after the 3rd March, at the offices of MESSRS. TAYLOR & GORDON,

Architects,
43 St. Francois-Xavier Street, Montreal.

A NEW LEAD PIPE JOINT.

A new method of making lead pipe joints, brought out by B. Cooper, Middleton, Lancashire, England, is illustrated in a recent issue of *Industries*.

The joint is made by forming on the two ends of the piping to be joined, right and left handed threads, and then joining them by means of a coupling nut. To accomplish this a small case of tools, which can easily be carried in a workman's pocket, are provided. These consist of a diminishing tool, having an internal conical recess, which is driven upon the end of one of the pipes, thereby compressing it into a diminished conical shape. An internal screwed nut of the required size, and open at both ends, is placed on the taper end of the pipe, and into the latter a plug is driven which forces out the sides into the thread of the nut, thereby molding a similar thread on the pipe. This process is repeated with a left hand threaded nut on the end of the other pipe, and afterwards the coupling is applied. The maker claims that by this means a joint may be made in about one-fourth of the time required by the soldering process, that it does not require a skilled workman, and that the total cost of the new joint is considerably less than

joints made by any other process. For removal purposes the joint may be uncoupled and re-made by simply unscrewing or screwing up the nut. It is stated that the Manchester, Salford and Heywood Corporations have granted permission to use these joints in connection with their water supply.

STRENGTH OF STEEL WIRE ROPE.

The railway line up to the Superghna, at Turin, is worked by a rope consisting of six plies of 8 wires each, or 48 wires in all. The diameter of each wire is 0.678 inch, of each ply 0.315 inch, and of the whole rope 0.985 inch, the weight being one pound per lineal foot. Tests from eight single wires from one ply gave a breaking load of from 908 to 1060 pounds, equivalent to from 83.5 to 97.4 tons per square inch. The breaking load of the remaining five plies was 911 to 1011 tons per square inch. Taking the net sectional area of the rope at 0.225 inch, and the lowest result above given as the average, the total breaking weight of the rope would be 19.3 tons per square inch.

IRON AND STEEL FOR BUILDING PURPOSES.

In a paper read before the Royal Institute of British Architects, Mr. T. F. Reade gives the following points in reference to wrought iron and steel riveted girders.

"It is of the utmost importance that all riveting should be done in the best possible manner. The 'snap' or end of the rivet, which is hammered out while hot, should project uniformly all around the diameter of the rivet, and should be of uniform size. The plates or angles should have the rivet holes countersunk by the drilling machines, and show on the outside at least one-fourth inch to three-fourths inch larger in diameter than the size of the insert. It is not advisable to make the webs of steel girders as thin as the increased strength of the material would seem to render possible, except in girders of dimensions much beyond our present example. In the rivet holes in both materials it is usual in good work that all holes should be drilled, but in steel girders of any description this must be done for the effect of punching upon the steel is to weaken the metal for a certain distance round the hole. This is sometimes remedied by punching the holes to about one-eighth inch less than the diameter of the rivet, and then drilling out the holes to the larger size.

CONTRACTS OPEN.

GUELPH, ONT.—A new bridge will be erected over the Conestoga river at Glen Allan.

NORWOOD, ONT.—The erection of new High School buildings is under consideration.

SAINT LAMBERT, P. Q.—An effort is being made to secure water-works and drainage.

WINDSOR, ONT.—Mr. Geo. Christie will erect a residence to cost about \$4,000 on Victoria ave.

FORT WILLIAM, ONT.—The Hudson Bay Company will erect a block of stores to cost \$26,000.

LONDON, ONT.—Mr. Geo. Craddock, architect, invites tenders until Monday, the 9th inst., for the erection of a house for W. H. Wortman.

KINGSTON, ONT.—Plans are being prepared for the rebuilding of the Congregational church, and tenders for the work will shortly be invited.

HAMILTON, ONT.—Local capitalists are considering the advisability of building a pipe line from Hamilton to the natural gas well at Weland, a distance of 40 miles.

NEW WESTMINSTER, B. C.—It is proposed to erect the largest and most costly business block in the province fronting on Columbia, McKenzie, Clarkson and Lorne Streets.

ESSEX CENTRE, ONT.—The ratepayers will vote on May 14th on a by-law to raise \$26,500 for the construction of water-works. The proposed plan includes a tube well and an elevated steel storage tank.

WOODSTOCK, ONT.—A representative of the Singer Sewing Machine Co. recently visited this and other towns in western Ontario with the view of selecting a suitable location for a wood-working factory which it is the intention of the company to build.

QUEBEC, QUE.—The Provincial Government has just purchased a site for a new prison building at Sault Au Recollet and a site in this city for a normal school.—A number of handsome donations have been given towards the rebuilding of Bishop's College at Lennoxville.

WINNIPEG, MAN.—At the recent meeting held in this city to consider the prospect for erecting a masonic temple, a committee, composed of Messrs. Leslie, Akin, Westbrook, Miller and others was appointed to obtain information regarding plans, site, etc., and report to a meeting to be held shortly.

W. TORONTO JUNCTION.—Humberside ave. will be extended through to Dundas street and graded.—It is proposed to open Keele street north of St. Clair avenue by a subway under the railways, the cost to be shared by the companies, the town and York township.—Mr. Chas. Brewer, will build extensive additions to the Peacock Hotel.

MONTREAL, QUE.—The plans for the new High School have been practically approved by the special committee of the Protestant School Commissioners, and it is probable that building operations will be begun at an early date.—Plans have been prepared for the completion of the R. C. church at Hochelaga, at an estimated cost of \$50,000. Action has been postponed for a short time.

PORT ARTHUR, ONT.—Tenders are invited by the town clerk until the first day of April next, for supplying to the corporation the following materials: 273 tons of best steel rails, approved section, 40 lbs. per yard, drilled at each end for electric railway connections; fish plates, nuts, bolts and spikes, frogs and switches complete, for four and one-third miles of railway; one diamond crossing of approved make, for 4 ft. 8½ inch gauge and specified angle, also electric railway supplies, such as generator, motor, cars, wire, etc. Above goods to be delivered at Port Arthur on or before 1st of June.

TORONTO, ONT.—A notice of motion has been given in Council to instruct the Board of Works to prepare estimates and call for tenders for widening the Queen Street subway.—It is reported that Toronto parties contemplate the erection of a large hotel at the corner of Bloor and Dundas

streets.—The following building permits have been granted: C. D. Delworth, 2 story and attic bk. store and dwelling, w. side Bathurst st., near Dupont, cost \$3,000; John Spence, pr. 2 story and attic bk. dwellings, w. side McMurrich st., cost \$1900; Hodge & Bell, 2 story bk. additions to dwellings, cor. Argyle and Lisgar sts., cost \$2,000; John Blair, 3 story bk. store and dwelling, 436 Queen st. w., cost \$6,000; J. Fraser, four att. 2 story and attic bk. fronted dwellings and one store, cor. Broadview ave. and Clôse st., cost, \$10,000; Rich. White, pr. att. 2 story bk. dwellings, e. side Strachan ave., n. of King st., cost \$2,600; Fred. W. Lyons, 2 story bk. dwelling, e. side Strachan ave., north of King st., cost \$1,300.

CONTRACTS AWARDED.

ALMONTE, ONT.—Messrs. James Wilson and John McKechnie have been given the contract for the erection of the new Reformed Presbyterian Church.

SILVERING GLASS.

The London *Plumber and Decorator* recently published the following process: (1) Argentic nitrate is dissolved in distilled water, and ammonia is added to the solution till the precipitate first thrown down is almost entirely dissolved. The solution is filtered and diluted, so that 100 cc. contains one gramme of argentic nitrate. (2) Two grammes of argentic nitrate are dissolved in a little distilled water, and poured into a litre of boiling distilled water, 1.66 gramme of Rochelle salt is added and the mixture boiled for a short time, till the precipitate contained in it becomes gray; it is then filtered hot. The glass having been thoroughly cleaned with (1) nitric acid, (2) water, (3) caustic potash (4) water, (5) alcohol, and lastly distilled water, is to be placed in a clean glass or porcelain vessel, the side to be silvered being placed uppermost. Equal quantities of the two solutions are then to be mixed and poured in so as to cover the glass. This should be done while the glass is well wet with distilled water. In about an hour the silvering will be completed. Then pour off the exhausted liquid, carefully remove glass, wash it in clean water, rub off silver deposited where not allowed to dry. The time required for the operation depends on temperature. If the solutions be warmed to about 30 deg. C. the silver is deposited in a few minutes; but it is safer to use them cold.

To prevent the paint on iron or wood from scaling off when exposed to the weather, first thoroughly wash the parts to be painted and then brush over the surface with hot linseed oil. By following this method, especially with iron articles, no scaling of the paint will occur. In cases where the articles to be painted are small and can be readily heated, it is better to heat them and plunge them into the oil. The thin liquid oil when hot enters into the pores of the metal, absorbs the moisture, and the paint then applied so firmly adheres that frost, rain or air cannot effect a separation.

Experiments lately made on the strength of bent pipes have shown the strain on the inside of the angle, due to efforts of the pipes to straighten themselves under pressure, a problem regarded as one of considerable intricacy in engineering prac-

tice, resolvable, however, by computation. In one of these experiments a copper pipe of 6¼-inch bore and three-sixteenths of an inch thick was employed, the angle was ninety degrees, and the legs sixteen inches long from the center. At a pressure of 912 pounds to an inch, the deflection of the pipes was nearly three-eighths of an inch, showing an enormous strain on the inner side in addition to the pressure.

THE STRENGTH OF BEAMS.*

Laying the bar now in a horizontal position, and placing its ends upon a pair of supports, we will proceed to load it in the middle, so as to bend the bar downwards. In this bended beam, it is tolerably evident that the lower fibres are stretched, while the upper fibres are compressed, and somewhere in the middle of the bar the length of the fibres is unaltered.

It is known by careful experiment that the elastic stretching of the material is just in proportion to the stress you put upon it; and, starting from this well-ascertained law, mathematicians have gone on to calculate everything that ought to take place in the beam when it is bent in the manner that we are supposing. But we all know that calculations are sometimes liable to error; and if we test the results of this particular theory by actual experiment, we shall find a discrepancy which is so startling and paradoxical, that it can only be understood as revealing a new and unsuspected property of the material; and for that reason it may be interesting to glance at it.

Taking the steps of the theory in their natural order, it is first calculated that under a given load the beam ought to show a certain curvature; then that the topmost fibre ought to be shortened by so much; the lowest fibre ought to be elongated by a nearly equal quantity; the tensile stress in that fibre, or its direct pull, ought therefore to be so many tons per square inch; and lastly, arguing from the known tensile strength of the material under a direct pull, it is calculated that a load of so many tons placed on the beam ought to be just sufficient to break it by tearing the lower fibre. But if we now take a cast-iron beam of square section, and proceed to test each step of the calculation by direct experiment, we shall find the following remarkable results:—

The calculated curvature of the beam is found to be either quite correct or very nearly so;—under this curvature the fibres of the beam are found to behave as they ought to do, the topmost fibre is duly shortened, and so far as can be ascertained by the most refined measurements the lowest fibre is pulled out to the full stretch indicated by theory—and yet, when we place the calculated breaking load upon the beam, the beam refuses to break; and as a matter of fact it will not give way until we have increased the load to more than double the calculated breaking weight.

The same discrepancy is observed in wrought iron and in steel, although not to so great an extent as in cast iron; and in the latter case its existence has never been satisfactorily explained. As the first steps in the calculation are proved by experiment to be correct, the natural inference seems to be that the calculated tensile

*From a paper read by C. Claxton Fidler, C.E., at a meeting of the Society of Architects, Jan. 13th, 1891.

stress must also be correct ; but if so, we must conclude that when cast iron is tested in this particular manner it is capable of exhibiting a tensile strength of 20 tons per square inch, which is equivalent to the tenacity of good plate-iron.

But if theory has failed to solve this particular enigma, it has taught us a lesson of great importance in another direction, for this very investigation of transverse bending has shown us the proper way to construct an iron or steel girder. In the tested beams it was found that different fibres of the beam were performing different functions, and that some were a great deal more heavily taxed than others. In such an unequal division of labor, of course it was the hardest worked members that were the most useful, while the idle ones were really valueless unless they could be transferred into some position where they would get a greater share of the work. But when the fact was recognized, it pointed the way to a reform in the constitution of the body politic. The idle portions of this co-operative community were not exactly swept away, but rather were removed to more useful positions ; and by this means the real efficiency of the structure has been enormously increased.

The first step was to remove a great mass of nearly inoperative metal at and near the middle of the depth, reducing it to a mere web between the two flanges, and thus producing a section like that of the rolled joist which is so familiar to architects. The idea was carried still further in the design of plate glass girders, like those of the Britannia bridge, which were supposed at the time to represent the most perfect form of construction that could be devised. But the reform has not stopped at this point, for in all modern girders of very large span, the plate-web has been done away with altogether, and has been replaced by a close lattice of diagonal bars, or by an open triangulation, leaving the two flanges separated from each other by a wide space, crossed only by the diagonal braces.

In this modern development of the old beam perhaps the most noteworthy feature is the well-defined subdivision of labor that has been organized. In the solid beam the functions of the different portions were a good deal mixed ; and when the thing broke down it was because some of the most useful of its members had been too severely strained. But in the modern structure every member has a definite duty assigned to it, and in each member the strength is made exactly proportionate to the burden ; so that in this reformed constitution of the fabric there is no ambiguity as to the function of each member or

the stress that it will be called upon to endure. The complex stresses of the old beam have been reduced to the elementary ones of direct tension and compression, and every member acts either as a tie or as a strut.

Prices of Building Materials.

Table listing prices for LUMBER (CAR ON CARGO LOTS) and Metallic Roofing Co. of Canada. Items include various sizes of clear picks, dressing, and shingles.

Table listing prices for Metallic Roofing Co. of Canada. Items include Heavy Eastlake galvanized steel shingles and Light Eastlake galvanized steel shingles.

Mrs. P. H. Mortimer Esq. Montreal, October 14th 1890. Full Canadian Architect & Builder and Contract Record.

Dear Sir, I have to inform you, that, the following resolution was unanimously adopted, at the First Annual Meeting of the Province of Quebec Association of Architects held in Montreal on 10th & 11th inst.:- We the Architects of the Province of Quebec now assembled in convention being satisfied that the Canadian Contract Record affords us a direct communication with the contractors. Resolved - That we pledge our support to it by using its columns when calling for tenders. Yours truly C. E. Blair Secretary.

Table listing prices for various building materials including steel shingles, lathing, roofing, and galvanized iron.

Table titled YARD QUOTATIONS listing prices for Mill cull boards, Shipping cull boards, and Scantling and joist.

Table listing prices for B. M. flooring, Clapboarding, and various types of shingles.

Table titled BRICK listing prices for Common Walling, Good Facing, and Sewer.

Table titled Pressed Bricks listing prices for Plain brick, Hard Building, Moulded and Ornamental, and Roof Tiles.

Table titled Stone listing prices for Common Rubble, Large flat, and Foundation Blocks.

Table titled Slate listing prices for Roofing and various colors like red, purple, and black.

Table titled Sand listing price for Per Load of 1 1/2 Cubic Yards.

Table titled PAINTS listing prices for White lead, Red lead, Yellow ochre, Green, Paris, Black lamp, Blue, Oil, Putty, Whiting, Paris white, Litharge, Sienna, and Umber.

Table titled CEMENT, LIME, etc. listing prices for Lime, Plaster, Hair, Cement, and various brands like Portland and Queenston.

Table titled HARDWARE listing prices for Cut Nails, American Pattern, Canadian Pattern, Steel nails, and Finishing nails.

MONTREAL PRICES.

Lumber, Etc.

Ash, 1 to 4 in., M.	\$13 00@13 00
Birch, 1 to 4 inch, M.	13 00 25 00
Basswood	12 00 20 00
Walnut, per M.	50 00 100 00
Butternut, per M.	22 00 40 00
Cedar, flat	00 04 00 06
Cherry, per M.	60 00 80 00
Elm, Soft, 1st	15 00 17 00
Elm, Rock	25 00 30 00
Maple, hard, M.	20 00 25 00
Maple, Soft	16 00 18 00
Oak, M.	40 00 95 00
Pine, select, M.	35 00 40 00
Pine, 2nd quality, M.	20 00 25 00
Shipping Culls	13 00 16 00
Mill Culls	8 00 10 00
Lath, M.	1 50 1 99
Spruce, 1 to 2 inch, M.	10 00 12 00
Spruce Culls	4 50 6 00
Shingles, 1st quality	2 00 3 00
and	1 25 1 50

Cement, etc.

Portland Cement, per barrel	\$ 2 70@ 3 00
Roman	2 70 3 00
Fire Bricks, per M.	20 00 30 00

Cut Nails:

Hot-cut Am. or Can. pattern, 3 inch and above	\$ 75 \$2 85
Hot-cut Am. or Can. pattern, 2 1/2 inch and above	3 00 3 25
Hot-Cut Am. or Can. pattern, 2 1/2 and 2 inch.	3 25 4 20
Am. pattern, 1 1/2 and 1 3/4 inch hot-cut	3 50 5 60
" " 1 1/2 inch "	4 25 5 20
Can. Pattern, cold-cut, 1 1/2 and 1 3/4 inch	3 25 4 45
" " 1 1/2 inch	3 75 5 95
Finishing Nails, per 100 lb. keg, 1 1/2	
Finishing Nails, per 100 lb. keg 1 1/2 to 1 3/4 inch.	75 cents advance on
and 1 3/4 inch.	Hot Cut Nails.
Finishing Nails, per 100 lb. keg, 2 inch and up.	

Paints, etc.

White Lead, pure, 25 to 100 lb. kegs.	6 50 7 00
" No. 1.	5 25 5 50
" No. 2.	4 50 5 00
" No. 3.	4 00 4 50
dry.	5 25 5 75
Venetian Red, English	1 50 1 75
yellow Ochre, French	1 25 3 00
Whiting, London, washed.	0 50 0 65
" Paris.	1 15 1 25

Oils:

Linseed, raw	0 63 0 55
" boiled	0 66 0 58
Olive, pure	1 10 1 15
" machinery	95 1 05
" extra, qt., per case	3 00 3 25
" 1/2 pts.	2 50 2 60
" 3/4 pts.	2 75 3 10
Spirits turpentine	0 67 0 70

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