Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☑ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☑ Quality of print varies/ Qualité inégale de l'impression
- ☐ Continuous pagination/ Pagination continue
- ☐ Includes index(es)/ Comprend un (des) index

  Title on header taken from:/ Le titre de l'en-tête provient:

- ☐ Title page of issue/ Page de titre de la livraison
- ☐ Caption of issue/ Titre de départ de la livraison
- ☐ Masthead/ Générique (périodiques) de la livraison

- ☐ Additional comments:/ Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐

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

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

VOL. 7. SEPTEMBER 10, 1896 No. 32.

THE CANADIAN CONTRACT RECORD,

PUBLISHED EVERY THURSDAY

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

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

C. H. MORTIMER, Publisher,

CONFEDERATION LIFE BUILDING, TORONTO.
Telephone 2362.

New York Life Insurance Building, Montreal.
Bell Telephone 2299.

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

Advertising Rates on application.

Subscribers who may change their address should give prompt notice of same. In doing so, give both old and new address. Notify the publisher of any irregularity in delivery of paper.

Notice to Contractors

Riverdale Park Foot Bridge,
(125 Feet Span.)

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, Ont., up to 5 o'clock p. m. on WEDNESDAY, SEPTEMBER 16TH, 1896, for the construction of a Wooden Foot Bridge at Riverdale Park, across the River Don.

Plans and specifications may be seen and forms of tender obtained at the office of the City Engineer

A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 5 per cent. on the value of the work tendered for must accompany each tender, otherwise it will not be entertained.

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

The lowest or any tender not necessarily accepted.

BERNARD SAUNDERS,
Chairman Committee on Works.
R. J. FLEMING, Mayor,
Chairman Board of Control.
Toronto, Sept. 5, 1896.

CONTRACTS OPEN.

SANDON, B. C.—Ira Black is preparing to build a $10,000 hotel in this town.

SOUTH DORCHESTER, ONT.—Wilson McCredie will likely rebuild his chopping mills.

ST. HYACINTHE, QUE.—There is some talk of constructing a $30,000 aqueduct here.

BARRIE, ONT.—A company has been formed here to erect an hotel, to cost $80,000.

FREDERICTON, N. B.—Repairs will be executed at the parliament buildings, to cost $13,000.

MORDEN, MAN.—Tenders are invited for the construction of a Methodist church in this village.

PORTAGE LA PRAIRIE, MAN.—A new site will in all probability be selected for the post-office building.

CHATHAM, N. B.—It is probable that D. & J. Ritchie will rebuild their saw mill recently destroyed by fire.

PARRSBORO, N. S.—The town council have engaged Professor Butler to make surveys, plans, etc., for a waterworks system.

WINNIPEG, MAN.—The C. P. R. are said to have under consideration the construction of a railway to Crow's Nest Pass, B. C.

CACHE BAY, ONT.—Dr. Bryce, Secretary of the Provincial Board of Health, has selected a site here for a consumptive sanitorium.

SUSSEX, N. B.—A new brick and stone power house, 28x50 feet in size, is to be erected in connection with the electric light works.

HALIFAX, N. S.—J. C. Dumaresq, architect, is receiving tenders this week for building a Methodist church on Oxford street.

YARMOUTH, N. S.—The ratepayers have authorized the town council to borrow the sum of $6,000 for the erection of an engine house.

TORONTO JUNCTION, ONT.—A proposal has been made by a company to erect an abattoir on the Canadian Pacific railway property.

SPRINGHILL, N. S.—The ratepayers are agitating the changing of the route of the Intercolonial railway so as to pass through this town.

GALT, ONT.—It is reported that plans will be prepared this winter for a block of stores and an opera house, to be erected by George Burnhart.

ST. JEROME, QUE.—Several plans have been received from different architects for the proposed new church, but no decision has yet been reached.

NAPANEE, ONT.—Tenders are being received this week for the rebuilding of the west ward school building. Thomas Hanley, Belleville, architect.

KASLO, B. C.—In consideration of certain privileges granted by the town, Mr. Moore has offered to put in and operate an electric light plant, to cost $10,000.

DELORAINE, MAN.—The Lake of the Woods Milling Co. will erect a grain elevator here. It is also stated that Mr. Mann, of Souris, has secured a site for an elevator.

WOODSTOCK, N. B.—Mr. Killeen, the promoter of the Woodstock and Centreville railway, is said to have made arrangements for the early construction of the road.

PORT HOPE, ONT.—Wm. Blackwell, architect, of Peterboro', has prepared plans for remodelling the St. Lawrence Hall, which will cost $6,000. It will be heated by steam.

LINDSAY, ONT.—The Simpson House is to be remodelled, at a cost of $2,000. W. A. White, architect. The same architect is erecting a new 2 storey and attic residence for himself, to cost $2,000, and is preparing plans for an addition to the curling rink.

WALKERTON, ONT.—Mr. A. Brunel, engineer of the Huron and Ontario Electric Railway, has presented his report on the route. A number of waterfalls are to be utilized for power purposes, and several bridges will be erected over the Saugeen and other streams.

TILSONBURG, ONT.—The work will commence in a couple of weeks on the new town hall. It will be a brick and stone structure, 102 ft. long and 54 ft. wide. The lower floor will contain a large vestibule, two offices, council chamber, fire hall, and a sitting room for the firemen. The second flat will consist of a large hall, with a gallery, and have a

seating capacity of 700. The stage will be 26 by 50 ft., with dressing rooms off each end. The hose tower will be 60 ft. high, and will be situated on the south-east corner of the building.

LONDON, ONT.—The by-law granting the sum of $150,000 for the construction of an efficient sewerage system was carried by the ratepayers last week.—Charles Cruickshank has made arrangements to erect a five storey brick hotel, with stone trimmings, on Richmond street.

QUEBEC, QUE.—Building permits have been granted as follows: Reparations of a house on Dorchester street, for C. Robitaille; contractor, E. Turcotte. Reparations of a house on St. Ursule street, for Dr. Hamet. Reparations of a house on St. Valier street for W. E. Brunet; E. St. Pierre, contractor.

PETERBORO', ONT.—It has been resolved to again invite tenders for lighting the streets of the city by electric light. A five years' contract will be granted.—A petition is in circulation asking that the town and county councils jointly erect a House of Refuge.—The contract for steam heating and plumbing of the Y. M. C. A. building is still open.

NEW WESTMINSTER, B. C.—The city council propose to ask the Dominion government for a grant of $50,000 in aid of the Fraser river bridge.—The council will probably furnish a site to the promoter of the projected linseed oil works.—The council intends applying to the Dominion government for the old drill shed property as a site for a new police station.

VANCOUVER, B. C. — The Tacoma Smelting & Refining Co. will shortly commence the construction of large smelting and refining works in this city. The capital stock of the company is $1,000,000.—The city council have approved of the route of the proposed Vancouver & Victoria Eastern Railway & Navigation Co.'s line and will request the government to grant financial assistance towards the construction of the road.

ST. JOHN, N. B.—W. H. Thorne & Co. have purchased property on the Thomson wharf, and will build a large warehouse.—It is proposed to erect a bronze statue to the memory of the late Sir Leonard Tilley. The cost will be about $10,000.—George Flewelling, of Westfield, has purchased the Palmer property in this city and will erect a new hotel thereon. Work will be commenced this fall and the building completed in the early spring.—The Dominion Cold Storage Co. have selected a site and will shortly commence the erection of their proposed buildings.—H. W. Mott, architect, will receive tenders until Friday, the 11th inst., for heating the Main street Baptist church.

HAMILTON, ONT.—T. Beasley, city clerk, invites tenders until noon to-day (Thursday), for the erection of a brick butter market on the square. Plans may be seen at the office of Stewart McPhie, architect.—Tenders are invited this week for the construction of pipe sewers on Poulette and Florence streets.—Mr. John Patterson, of the Cataract Power Co., states that work will be commenced on the plant within the next two weeks. The company propose to obtain their power from DeCew Falls, near St. Catharines.—Bids are invited by the Cataract Power Company until the 15th inst., for the erection of a stone power house, 40×250 feet, and for 2,600 feet of steel pipe, 6 feet in diam., with a stand pipe 4 feet diam., and 220 feet high; also for 4 turbines of 640 h.p. each, with valves, governors, etc., and for 2,500 cedar poles, 8-in. top, 35 feet long.

MONTREAL, QUE.—At a meeting of the Chambre de Commerce held last week, the committee appointed to study the question of extending the North Shore Railway from Sorel to Levis laid its report on the table and decided to ask the Dominion government to give the South Shore Railway all privileges, rights, subsidies and other advantages granted to the railroad companies established in the public interest.—L. R. Montbriand, architect, is preparing plans for one three-storey cottage to be erected on Esplanade street for Chs. Gratton.—Building permits have been granted as follows: two houses, 50×32 feet, 2½ stories, stone and brick, on Plessis street, for Honore Dubreuil, Esq. Probable cost, $4,000; Two houses, 40×62 feet, two stories, brick front, on Wellington street, for Mde. H. S. Lomas. Contractors, masonry, Olivier Goyette; carpenter and joiner's work, Louis Trudet; one house on Inspector street, 44×40 feet, wood lined in brick, cost $1,500.

TORONTO, ONT.—Tenders will be received by the Chairman of the Board of Control until Wednesday, the 16th inst., for the construction of a wooden foot bridge at Riverdale Park, across the river Don. Plans may be seen at the office of the city engineer.—The town council of North Toronto have concurred in the report of the Water, Fire and Light committee with respect to enlarging the present water works basin, and tenders will be asked for the proposed work.—The plans submitted by Messrs. Strickland & Symons, architects, have been accepted by the Fire and Light committee for the addition to the Bay street fire hall, the estimated cost being $3,500. The addition will give accommodation for two engines, two reels, a water tower and a chemical engine, besides providing rooms for the chief and secretary.—His Worship the Mayor will shortly lay before the council a message favoring the construction of an extension of the street railway system to the Island by way of the Queen's wharf and the sand bar, by means of a bridge.—The Court of Revision will be held on the 18th inst., for the hearing of appeals against the assessments for the following works. brick pavement on Huron street, cost $23,500, on Grand Opera House lane, cost $440; on Spencer avenue, cost $6,000; and on Lowther ave., cost $3,900.—The Ontario government is considering the advisability of installing an electric light plant at the Central Prison. The question of putting in a plant at the asylum at Brockville is also being considered.—Wm. Radcliffe, corner Queen and Parliament streets, desires a site, 50x150 ft., in Rosedale or annex. - Building permits have been granted as follows. G. W. Gouinlock, architect, one-storey add. to chapel and conservatory, St. James cemetery, cost $3,000; J. H. Farr & Co., one-storey bk. add. to factory, Morse st., cost $1,500.

OTTAWA, ONT.—The following petitions have been reported on in parliament: Hudson Bay and Pacific Railway Co., for an act of incorporation to build a line from Fort Churchill to Calgary; Hudson Bay Navigation Co., for the building of a canal between the Nelson river and Hudson Bay; Mather Bridge and Power Co., for power to construct a bridge over the Niagara river at Fort Erie.—In all probability Mr. A. C. Hutchison, architect, of Montreal, will be engaged to prepare plans for the addition to the hospital.—The main drainage committee of the city council have accepted the report of Messrs. Keefer & Davey, the engineers appointed to report on a system of drainage. The total cost of the work is estimated at $414,358,50. The report and plans will be submitted to the Provincial Board of Health for approval on the 15th inst.—The Dominion estimates for the fiscal year ending June 30th, 1897, have been presented to parliament.

The amount voted for canals is as follows:

Soulanges, construction	$800,000
Cornwall, enlargement	185,000
Rapide Plat, enlargement	170,000
Galops	250,000
St. Lawrence River and Canals, north channel and surveys	20,000
Murray, equipment	5,000
Trent, construction	500,000
Sault Ste. Marie, construction and equipment	44,000
Lachine	238,000
Lake St. Louis Channel, straightening and deepening	95,000
Grenville, enlargement	90,000
Welland, improvements	5,000
Lachine—Extending electric lights along canal	4,550
Beauharnois—Dredg'g shovel, upper entrance	5,000
Replacing cope stones on nine locks	1,600
Changing circuit of telephone from ground to metallic	800
Chambly—Build rubble walls along highway	2,500
Rebuild abutment walls, etc., lock 8	4,000
Gravel bank of canal	1,500
To build culvert under canal at St. Johns	6,000
Carillon and Grenville—Build a set of spare lock gates	2,900
Trent—Build new dam at Chisholm	5,500
Remove rock in channel at Hastings	3,500
Build guard booms and piers at Peterboro' swing bridge	2,500
Dredge channel at Katchanawan Lake	2,500
Build landing pier at Burleigh	2,000
Remove rock in channel at Bobcaygeon	3,500
Provide hoisting engine and boiler	1,000
Rideau—Construct bridge across by-wash at Smith's Falls	5,000
Complete sheet piling at Deep Cut, Ottawa	8,500
Welland—Remove sand bars in Dalhousie and Port Colborne harbors	4,000
Towards building superstructure of piers at Port Dalhousie	30,000
Rebuild in cement walls of lock No. 24	25,300
Renew towpath bridge	5,000
Renew one pair of lock gates and raceway bridge, lock 7, old canal	5,000
Clean and deepen feeder back ditches	2,000

For public buildings the following appropriations are made:

Nova Scotia—Halifax drill hall	100,000
Lunenburg post office, custom-house, etc., to complete	1,000
New Brunswick—Marysville public building	8,000
Tracadie lazaretto	1,000
Quebec—Grosse Isle quarantine station	6,000
Quebec post office, new wing and repairs and alterations to old building, furniture, etc	2,500
Richmond post office and customs and inland revenue offices, to complete	14,000
Rimouski post office, custom house, etc., to complete	10,000
St. Vincent de Paul Penitentiary	7,000
Ontario—Dominion reformatory	50,000
Manitoba—Portage la Prairie post office, etc.	20,000
North-west Territories—Court-house, lock-up and police accommodation	2,000
Moosomin court-house, additions, etc.	3,000
Prince Albert court house and jail accommodation, new works and repairs	13,000
British Columbia—New Westminster drill hall, revote of $4,900 lapsed	6,000
Victoria drill hall and accessory buildings, revote of $4,000 lapsed	4,000
Victoria new post office	100,000

For improvements to harbors and rivers the grants are as follows:

Nova Scotia—Digby, pier	2,800
Georgeville, extension to wharf	1,800
Grand Etang	3,000
Prince Edward Island—General repairs to piers and breakwaters	6,000
Kier's shore, extension of pier, repairs and dredging	2,500
Souris, reconstruction of breakwater at Knight's Point	37,500
New Brunswick—Gardner's Creek, new wharf	5,500
Negro Point breakwater, St. John Harbor	20,000
River St. John, including tributaries	16,000
Quebec—Anse a l'Eau, Tadousac pier	1,500
Etang du Nord, repairs, etc.	1,000
Grande Riviere, to complete harbor of refuge by strengthening and extending the wharf, etc	2,000
Laprairie, works in connection with ice piers, dredging steamboat channel, etc.	10,000
Phillipsburg pier	1,250
Piers, Lake St. John, including improvement of approaches	2,500
River Richelieu, Belœil channel guide piers	6,000
River St Maurice, improvement of channel Grandes Piles and La Tuque, dredging plant, etc.	3,000
St. Jean, Ile d'Orleans	400
Ontario—Collingwood, repairs to breakwater	2,850
Kingston harbor, Lake Ontario	4,000
Lake Simcoe and Couchiching, regulation of waters	5,500
Owen Sound harbor, dredging, etc.	20,000
Toronto harbor, works at eastern entrance, etc.	25,000
British Columbia—Columbia river, improvements above Golden	4,600
Victoria harbor, dredging in inner harbor	10,000
Fraser river, improvements of ship channel	25,000
Skeena river	3,500

FIRES.

Alfred Poor's dwelling at Oromocto, N. B., was destroyed by fire last week.—Fire at Noel, Hant's County, N. S., destroyed David Hennigar's carding mill and contents.—A saw mill at Wellandport, Ont., owned by Albert Frank, was burned recently.—The steam saw and grist mill at Collina, N. B., owned by Aaron Kier-

stead, was totally destroyed by fire on the 31st of August. There was no insurance on the building.—The Commercial Hotel at Vankleek Hill, Ont., owned by George Constantineau, was completely destroyed by fire on Wednesday of last week. Loss $10,000; insurance $4,500.—The brick residence of Peter McNally, of South Norwich, near Tilsonburg, Ont., was consumed by fire on the 1st inst. The loss is about $7,000, with $2,000 insurance. —John McMulkin's shingle mill at Marble Cove, St. John, N. B., was burned on Saturday last. The loss is estimated at $7,000.—The Revere House at Simcoe, Ont., owned by Mr. McQueen, has been burned. Loss, $3,000.—The residence of Dr. Underhill, Mission City, B. C., was totally destroyed by fire last week. Loss $3,000.

CONTRACTS AWARDED.

GODERICH, ONT.—The contract for laying the intake pipe has been awarded to William Lyons, of Windsor, the figure being $5,000.

FREDERICTON, N. B.—The contract for the Victoria hospital annex has been awarded to William J. Scarr and William Minue, at the price of $3,000.

HAMILTON, ONT. — Contracts for sewers have been let as follows: Poulette street, E. C. Murton, 50 cents a foot; Florence street, J. J. Armstrong, 23 cents a foot.

GRIMSBY, ONT.—The contract for building an iron bridge over the Forty Mile creek has been awarded to the Stratford Bridge Company. W. F. Gibson, of Beamsville, gets the masonry work.

LINDSAY, ONT.—W. G. Woods has secured the contract for the hot water heating of Wm. McKennzie's summer residence at Kirkfield. Oxford radiators will be used.—Smith & Co. will put a furnace in the Benson House.

WINNIPEG, MAN.—Tenders for asphalt pavement on Assiniboine and Kennedy streets were received as follows: Kelly Bros., natural stone, $18,964.60, $2.35 per yard, stone 87 cents and $1 (accepted); the Warren Scharff Co., natural stone, $21,285, artificial stone, $20,215, $2.60 per square yard for pavement, $1 and $2 for natural stone, 80 cents for artificial.

MONTREAL, QUE. — The Lachine Rapids Hydraulic & Land Co. have closed a contract with the National Underground Conduit Co., of New York, for 500,000 ft. of conduit. The duct is a cement lined pipe, embedded in concrete. —W. McLea Walbank, architect, has awarded the following contracts for a house, 3 storeys, corner of McCord and Seminary streets, for the Lachine Rapids Hydraulic and Land Co.: Masonry, J. B. St. Louis; carpenter and joiner's work, Shearer & Co. Other contracts not let.— P. Lortie & Son, architects, have let contracts as follows for a house, 3 storeys, on Inspector street, for Dufort & Desrochers: All trades by day work. — C. St. Jean, architect, has let the contract for the Cathedral and Sacristy of Nicolet, for the Roman Catholic Episcopal Corporation, to Paquet & Godbout, of St. Hyacinthe. The dimensions are 192 ft. by 97 ft., with the steeple 185 ft. high. The Sacristy is 62 ft. by 43 ft.—Barkeau & Fournier have been awarded the contract for the masonry for the residence of H. Weir, to be erected on Drummond street. Gamelin & Huot are the architects.—The following contracts have been awarded by M. Eric Mann, architect, for a varnish factory: Masonry, Hegan & Stewart; carpenter and joiner's work, Robert Neville; brick, S. Wand. Other trades not let. —The contract for the concrete dam, power house and rock excavation in connection with the development of the Chambly water power has been awarded by the Lachine Rapids Hydraulic & Land Company to Messrs. Peter Lyall & Sons. There were eight or nine tenders. The contract embraces from $300,000 to $400,000 and will be begun immediately and carried on all winter, the entire job to be completed by October, 1897.

MIXING CONCRETE.

In the making of concrete the matter of mixing is fully as important as the choice of the materials used, for with unskillful methods there may be a vast amount of waste, both in the quantities of materials used and in the final strength of the concrete mass. It is possible to obtain as strong and as satisfactory results with a small amount of cement and a large amount proportionally of well chosen aggregate as with a large amount of cement and haphazard mixing with ill chosen aggregate. In any good concrete the main object is to fill the voids. The spaces between large stone should be filled with smaller stone; these spaces so reduced should in turn be filled with sand of a coarse variety, and then the smallest spaces filled entirely with cement. Every piece of stone and particle of sand, therefore, should be coated well with cement, and the best results are obtained where there is not too much of any material—stone, sand or cement. Large masses of pure cement scattered through a mass of mass of concrete shows a waste of good material, for a piece of good hard stone would do better work in the place of the mass of cement, and it would cost a fractional part as much.

There has been more or less discussion as to the kind of material that is best in concrete making. First, in regard to the size: For heavy and massive work, large stones may be used, sometimes as large as a man's head. Then the rest of the stone may be graded down so as to have the spaces between the stone well filled. The matrix should be composed of coarse sand, at least as large as the coarsest granulated sugar, and the cement should be thoroughly mixed with this sand before the mortar so formed is incorporated with the stone. Only sufficient water should be used to insure a stiff tenacious mass. It is often advisable to wet the stone and coarse material before mixing. As for the kind of aggregate that depends wholly on the use to which concrete is to be put. For heavy loads and masonry of high order, only hard broken stone, balast, granite, etc., should be used. For fire proof work use broken brick, pottery, clinker, slag, and such material as withstands great heat. For light floors, filling, etc., use crushed coke, clean cinders, etc. For heavy wear in pavements use pea granite or other hard stone. There is a good deal of controversy at present among engineers, says Ross F. Tucker in the Brickbuilder, as to the relative value of broken stone and round pebbles in making concrete. Tests have been made which show no practical difference in the strengths of concrete made under similar conditions with the two materials, yet judgment and reason would certainly choose stone in place of pebbles for important work.

There is often a confusion of ideas in naming the proportion of the materials for making concrete, due to the fact that it is not generally understood that three parts of sand and six parts of coarse 2 inch stone do not make nine parts together. The voids in coarse stone amount to about 47 per cent. of the mass, or, roughly, 50 per cent., which means that it is necessary to add to a certain mass of stone nearly half as much sand in order to fill the voids without increasing the bulk at all. According to Trautwine the following table gives the perfect ratio:

1 cubic yard of broken stone with 0.5 of its bulk voids requires 5 cubic yards gravel or fine stone.
0.5 cubic yard gravel or fine stone, with 0.5 of its bulk voids requires 0.25 cubic yard sand.
0.25 cubic yard sand with 0.5 of its bulk voids requires 0.125 cubic yard dry cement.

So when a mixture is stated by the formula 1—3—6— the result is a mixture of one part of cement to six parts of aggregate, and not of nine parts of aggregate, as might be assumed. This is a matter of much importance, not only in estimating, but in the strength of the concrete, for if one mixture is made of one part cement and, say, six parts of broken stone, and another mixture is made of one part cement, two parts sand, two parts of small stone, and six parts of large stone, the result of the second mixture will be far superior to the first in economy of materials, volume, and equal in strength. In all cases this idea should be developed to its fullest extent, where concrete is used intelligently.—Carpentry and Building.

STRENGTH OF BRIDGE AND TRESTLE TIMBERS.

A committee of the International Association of Railway Superintendents of Bridges and Buildings appointed to report on the strength of bridge and trestle timbers, have arrived at the following conclusions:

(1) Of all structural materials used for bridge and trestles timber is the most variable as to the properties and strength of the different pieces classed as belonging to the same species; hence it is impossible to establish close and reliable limits for each species.

(2) The various names applied to one and the same species in different parts of the country lead to great confusion in classifying or applying results of tests.

(3) Variations in strength are generally directly proportional to the density or weight of timber.

(4) As a rule, a reduction of moisture is accompanied by an increase in strength; in other words, seasoned lumber is stronger than green lumber.

(5) Structures should be, in general, designed for the strength of green or

(Concluded on Page 4.)

moderately seasoned lumber of average quality and not for a high grade of well-seasoned material.

(6) Age and use do not destroy the strength of timber unless decay or season checking takes place.

(7) Timber, unlike materials of a more homogeneous nature, as iron or steel, has no well-defined limit of elasticity. As a rule, it can be strained very near to the breaking point without serious injury, which accounts for the continuous use of many timber structures with the material strained far beyond the usually accepted safe limits. On the other hand, sudden and frequently inexplicable failures of individual sticks at very low limits are liable to occur.

(8) Knots, even when sound and tight, are one of the most objectionable features of timber, both for beams and struts. The full-size tests of every experimenter have demonstrated not only that beams break at knots, but that invariably timber struts will fail at a knot or owing to the proximity of a knot, by reducing the effective area of the stick and causing curly and cross-grained fibres, thus exploding the old practical view that sound and tight knots are not detrimental to timber in compression.

(9) Excepting in top logs of a tree or very small and young timber, the heart wood is, as a rule, not as strong as the material farther away from the heart. This becomes more generally apparent, in practice, in large sticks with considerable heart wood cut from old trees in which the heart has begun to decay or been wind shaken. Beams cut from such material frequently season check along middle of beam and fail by longitudinal shearing.

(10) Top logs are not as strong as butt logs, provided the latter have sound timber.

(11) The results of compression tests are more uniform and vary less for one species of timber than any other kind of test; hence, if only one kind of test can be made, it would seem that a compressive test will furnish the most reliable comparative results.

(12) Long timber columns generally fail by lateral deflection or "buckling" when the length exceeds the least cross-sectional dimension of the stick by 20; in other words, when the column is longer than 20 diameters. In practice the unit stress for all columns over 15 diameters should be reduced in accordance with the various rules and formulæ established for long columns.

(13) Uneven end bearings and eccentric loading of columns produce more serious disturbances than are usually assumed.

(14) The tests of full-size long compound columns, composed of several sticks bolted and fastened together at intervals, show essentially the same ultimate unit resistance for the compound column as each component stick would have if considered as a column by itself.

(15) More attention should be given in practice to the proper proportion of bearing areas, in other words, the compressive bearing resistance of timber with and across grain, especially the latter, owing to the tendency of an excessive crushing stress across grain to indent the timber, thereby destroying the fiber and increasing the liability to speedy decay, especially when exposed to the weather and the continual working produced by moving loads.

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

MUNICIPAL DEPARTMENT

LEGAL DECISIONS AFFECTING MUNICIPALITIES.

CITY OF HALIFAX V. LITHGOW.—By sec. 14 of the Nova Scotia statute, 53 Vict., ch. 60, the City Council of Halifax was authorized to borrow money for covering the sidewalks of the city with concrete or other permanent material, one-half the cost to be a charge against the owners of the respective properties in front of which the work should be done, and to be a first lien on such properties. A concrete sidewalk was laid, under authority of this statute, in front of L's property, and he refused to pay half the cost on the ground that his predecessor in title had in 1867, under the Act 24 Vict., ch. 89, furnished the material to construct a brick pavement in front of the same property, and that it would be imposing a double tax on the property if he had to pay for the concrete walk as well. Held, reversing the judgment of the Supreme Court of Nova Scotia, that there was nothing dubious or uncertain in the Act under which the concrete sidewalk was laid; that it authorized no exemption in favor of property owners who had contributed to the cost of sidewalks laid under the Act of 1861; and that to be called upon to pay half the cost of a concrete sidewalk in 1891 would not be paying twice for the same thing, because in 1867 the property had contributed bricks to construct a sidewalk which in 1891 had become worn out, useless and dangerous.

FERRIER V. CITY OF TORONTO.—A municipal corporation whose existence is derived solely from the statutes creating it, is not liable for damages arising out of the enforcement of a by-law passed under a misconstruction of its powers, unless such liability is expressly or impliedly imposed by the statute. A city corporation acting in excess of its powers, passed a by-law amending an existing by-law for licensing pedlars, prohibiting them from peddling on certain streets, and the officers of such corporation in carrying out the by-law declined to issue licenses except in the restricted form, which the plaintiff refused to accept, and, while attempting to peddle without a license was interfered with by the police, over whom the corporation had no control. Held, that the corporation were not liable. Neither does any liability arise where a licensee, who had taken out a license in the restricted form, is damnified by being prevented by the police from peddling on prohibited streets.

TOWNSHIP OF LOGAN V. HURLBURT.—The directions of sec. 84 of the Public Health Act, R.S.O. ch. 205, are imperative, and where, instead of acting as directed in that section, the members of a local board of health allow a person suffering from an infectious disease to go into an adjoining municipality, they are liable to repay to that municipality moneys reasonably expended in caring for the sick person and preventing the spread of the disease.

MR. A. W. CAMPBELL, C. E.,

PROVINCIAL ROAD INSTRUCTOR FOR ONTARIO.

Although the appointment of Mr. A. W. Campbell to the position of Provincial Road Instructor is of quite recent origin, his countenance is already familiar to a large number of municipal officers throughout Ontario. He is a native of the province, having been born at Wardsville, Middlesex county, in 1863, and is the son of Mr. J. C. Campbell, a farmer in the township of Ekfrid. He spent his boyhood days on the farm, and received the usual education afforded by a country school. In 1885 he graduated in engineering and surveying from the School of Practical Science, Toronto, after which he was in partnership for several years with Mr. James A. Bell, of St. Thomas, the firm doing an extensive business as

MR. A. W. CAMPBELL, C. E.

municipal engineers. In 1891 he was appointed city engineer of St. Thomas, which position he held with much honor until his appointment as Provincial Road Instructor by the Ontario government in February of this year.

During his term as city engineer of St. Thomas he paid special attention to road-making, especially the construction of earth, gravel and macadam roads suitable for small towns and villages, and under his superintendence the streets of the city were greatly improved, until it is said that St. Thomas has to-day a greater mileage of permanently improved streets than any other Canadian city.

When the Ontario Good Roads Association was formed three years ago, Mr. Campbell was appointed a member of the board of directors, and is at present one of its vice-presidents. In this connection he has taken an active interest in addressing farmers' institutes, dairy and other meetings in the rural sections of the province, urging the necessity of more systematic and uniform work, and endeavoring to create deeper interest in the subject among the people at large, by conveying information on the correct methods of road-making. A year ago he was appointed a member of the Ontario Toll-Roads Commission, and as such visited different parts of the province.

The office of the Provincial Road Instructor is in the Parliament Buildings in Toronto, where it is under the supervision of the Minister of Agriculture. Mr. Campbell's duties will be entirely educational in character, and will consist in giving instruction and information to municipal officers and pathmasters regarding the building and maintenance of highways. His services have already been called into requisition by a large number of municipalities, which have been greatly benefitted by his advice. It is understood also that he will lecture on the subject of road making at the Agricultural College, and probably at other educational institutions.

Mr. Campbell's excellent training and wide experience has ably fitted him for the position which he occupies, and the success of his labors will no doubt be in evidence by the improved character of the roads constructed throughout the province.

SEWER PIPE STANDARD.

The Illinois Society of Engineers and Surveyors recommend that all sewer pipe be salt glazed, vitrified earthenware of the hub and spigot pattern and of the following dimension:

Diameter of Pipe Inches	Length Feet	Depth of Socket	Annular space. Inches	Thickness of shell Inches.
3	2	1½	¼	⅝
4	2	1½	¼	⅝
6	2	2	¼	¾
8	2½	2½	⅜	¾
10	2½	2½	⅜	⅞
12	2½	2½	½	1
15	2½	3	½	1¼
18	2½	3	½	1½
20	2	3	½	1¾
24	2	3½	⅝	2
30	2	4	⅝	2½

The pipe to be circular in form, with no variation allowed from a true circle.

The committtee believe that it is fairer to the manufacturer and will insure better results to require a given crushing strength for each size of pipe, rather than the practice of requiring a certain thickness of shell. This strength requirement should be calculated so as to support with safety the weight of the earth coming upon the pipes. The support of the earth by friction along the sides of the trench is a large factor entering into the calculation, which the committee have had neither time nor facilities for determining, and for this reason would recommend that the thicknesses given above be adopted as standard until the proper investigation can be made for determining the strength.

The Londonderry Iron Co., Londonderry, N. S., are this year beginning the manufacture of turned and bored water pipe. This company is the first in America to introduce the manufacture of this class of pipe, it having hitherto been made solely in Great Britain. They have also made a new departure in manufacturing valves and hydrants. They report large sales of pipe to St. John, N. B., Amherst and Halifax, N. S., and Glace Bay, C. B., and of valves and hydrants to Truro and other towns.

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

ENGINEERS

WM. NEWMAN, C. E.
A. M. Can. Soc. C. E., M. Am. W] Wks. Assn.
CITY ENGINEER OF WINDSOR.
Civil and Sanitary Engineer
Waterworks, Sewerage, Drainage, Pavements, &c.
Fleming Block - WINDSOR, ONT.

C. H. MASSY, B. E., M. C. S. C. E.
CIVIL ENGINEER
Railways, Waterworks, Foundations,
. . . Drainage, &c., &c. . . .
180 St. James Street - MONTREAL

GEO. WHITE - FRASER
C.E., D.T.S., A. AM. INST. ELEC. ENG
CONSULTING
ELECTRICAL ENGINEER
Electric Railways and Electric Light.
SPECIALTY: Specification and Superintendence of
MUNICIPAL PLANTS.
18 Imperial Loan Building - TORONTO.

VAUGHAN M. ROBERTS
Civil and Sanitary Engineer
Waterworks, Sewers, Electric Light,
. . . Electric Railways. . . .
Plans and Specifications prepared.—Work Superintended. . . 18 Ontario Street, ST. CATHARINES

E. CARL BREITHAUPT
CONSULTING
Electrical Engineer
MEM. AM. INST. E. E.
Electric Lighting and Railway Work BERLIN, ONT.

DAVIS & VAN BUSKIRK
Graduates Royal Military College of Canada.
- - Civil Engineers - -
SPECIALTY: Municipal Engineering, including Drainage, Sewerage, Sewage Disposal, Waterworks, Roadways and Bridges.
W. F. Van Buskirk, A. M. Can. Soc. C. E., Stratford.
Wm Mahlon Davis, M. Can. Soc. C. E., Woodstock.

ALAN MACDOUGALL
M. CAN. SOC. C. E. M. INST. C. E.
CIVIL AND SANITARY ENGINEER
ABERDEEN CHAMBERS,
35 East Adelaide St. - TORONTO
New Telephone Number, 1252

INDEX TO ADVERTISEMENTS
In the "Canadian Architect and Builder."

WILLIS CHIPMAN, B. A. Sc.,
M. Can. Soc. C.E.; M. Am. Soc. C. E.;
M. Am. W. W. Ass'n.
CIVIL AND SANITARY ENGINEER
Water Works - Sewerage
Sewage Disposal
103 BAY STREET - TORONTO.

JOHN GALT, C.E.&M.E.
(Member Can. Soc. C. E.)
CONSULTING ENGINEER AND EXPERT
Specialties:
Water Supply and Sewerage, etc.
Electric Power, Lighting, Railways, etc.
Offices:
CANADA LIFE BUILDING - TORONTO

J. McDOUGALL, C. E.,
ENGINEER OF THE COUNTY OF YORK
GENERAL MUNICIPAL ENGINEER
Consulting Engineer for Municipalities in regard to Electric Railway and other Franchises.
Specialties: Bridges, Foundations, Electric Railways, and Roads. Surveys made; Plans, Specifications and Agreements prepared, and work superintended.
COURT HOUSE, - TORONTO.

Paving Granite
Granite Sets for Street Paving.
CURBING cut to any shape ordered.
Quarries, St. Phillipe d'Argenteuil, P. Q.
Address all communications to
JOS. BRUNET - COTE DES NEIGES, MONTREAL

BELLHOUSE, DILLON & CO., 30 St. Francois Xavier Street MONTREAL
Sole Agents in Canada for the **COMPAGNIE GENERALE DES ASPHALTES DE FRANCE**
(ROCK ASPHALT)
PORTLAND CEMENT NORTH'S CONDOR ..... SITTING LION, and ...WHITE CROSS ... BRANDS
Paving and Fire Brick a Specialty

ALEX. GARTSHORE, PRESIDENT. J. G. ALLAN SEC'Y & TREAS. JAS. THOMSON, VICE PRES'T & GEN'L M'G'R.
ESTABLISHED 1870 INCORPORATED 1896
THE GARTSHORE-THOMSON PIPE & FOUNDRY CO. LTD.
MANUFACTURERS OF CAST IRON WATER & GAS PIPE, FITTINGS & SEWER PIPE
SPECIAL CASTINGS AND ALL KINDS OF WATER WORKS SUPPLIES.
HAMILTON, ONT.

Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: Although the demand for builders' supplies is not active, a fair trade is doing in most lines. Plumbers' supplies are quiet on city account, but country trade exhibits more life. Cut nails are moving with more freedom, at the base price of $2.75 per keg. An improvement is noted in building paper. In galvanized iron and iron pipe there is a steady trade. A slight advance in window glass has taken place in Belgium, and enquiries for plate glass are increasing.

MONTREAL: Few new features are reported in the line of builders' supplies, the demand being confined to small quantities for actual requirements. There is little doing in cut nails and the heavy metal market. Window glass is stronger, and some fair-sized sales have been made. Small lots of cement are meeting with good demand, and a moderately active business is reported at steady prices.

LUMBER.

CAR OR CARGO LOTS.

	Toronto. $	Montreal. $
1¼ to 2 clear picks, Am ins	33 00@36 00	40 00@45 00
1¼ to 2 three uppers, Am ins	37 00	40 00 45 00
1¼ to 2, pickings, Am ins	26 00	27 00 30 00
3 inch clear		40 00 45 00
1 x 10 and 12 dressing and 1 better	20 00	22 00 18 00 20
1 x 10 and 12 mill run	16 00	17 00 19
1 x 10 and 12 dressing	20 00	22 00 18 00
1 x 10 and 12 common	13 00	14 00 8 00 10 00
Spruce culls	10 00	11 00 8 00 10 00
1 x 10 and 12 culls	9 00	10 00 9 00
1 inch clear and picks	28 00	3200 35 00 40 00
1 inch dressing and better	20 00	22 00 18 00 20 00
1 inch siding, mill run	14 00	15 00 12 00 16 00
1 inch siding, common	12 00	13 00 10 00 13 00
1 inch siding, ship culls	11 00	12 00 10 00 11 00
1 inch siding, mill culls	9 00	10 00 8 00 9 00
Cull scantling	8 00	9 00 8 00 9 00
1¼ and thicker cutting up plank	24 00	26 00 22 00 25 00
1 inch strips, 4 in to 8 in. mill run	14 00	15 00 14 00 15 00
inch strips, common	11 00	12 00 10 00 12 00
1¼ inch flooring	16 00	17 00 12 00 15 00
1⅝ inch flooring	16 00	17 00 12 00 15 00
XXX shingles, sawn, per M 16 in	2 25	2 30 2 60 2 60
XX shingles, sawn	1 40	1 50 1 60 1 70
Lath	1 60	1 50

VALD QUOTATIONS.

Mill cull boards and scantling	10 00	10 00	12 00	
Shipping cull boards, promiscuous widths	13 00		13 00	
Shipping cull boards, stocks	16 00		16 00	
Hemlock scantling and joist up to 16 ft	11 00	12 00	10 00	
Hemlock scantling and joist up to 18 ft	12 00	13 00	12 00	13 00
Hemlock scantling and joist up to 20 ft	13 00	14 00	13 00	14 00
Cedar for block paving, per cord	5 00		5 00	
Cedar for kerbing, 4 x 14, per M	14 00		14 00	
Scantling and joist, up to 16 ft	14 00		14 00	
" " 18 ft	15 00		16 00	
" " 20 ft	16 00		16 00	
Scantling and joist, up to 22 ft	17 00		17 00	
" " 24 ft	19 00		19 00	
" " 26 ft	20 00		21 00	
" " 28 ft	22 00		23 00	
" " 30 ft	24 00		25 00	
" " 32 ft	27 00		27 00	
" " 34	29 50		29 50	
" " 36 t	31 00		31 00	
" " 38 ft	33 00		33 00	
" " 44 ft	34 00		36 00	
Cutting up planks, 1¼ and thicker, dry	25 00	28 00	25 00	30 00

B. M.

1⅛ in. flooring, dressed, F M	26 00	30 00	28 00	31 00
1⅛ inch flooring, rough, B M	18 00	22 00	18 00	22 00
1¼ " dressed, F M	25 00	28 00	27 00	30 00
1¼ " undressed, B M	18 00	19 00	18 00	19 00
1¼ " dressed	18 00	20 00	18 00	22 00
1¼ " undressed	12 00	15 00	12 00	15 00
Beaded sheeting, dressed	20 00	35 00	22 00	35 00
Clapboarding, dressed		12 00	8 00	12 00
XXX sawn shingles, per M 18 in	2 60	2 70		3 00
Sawn lath	2 50	2 60	2 50	2 60
Cedar		2 90		2 90
Red oak	30 00	40 00	30 00	40 00
White	37 00	45 00	35 00	55 00
Basswood, No. 1 and 2	28 00	30 00	18 00	20 00
Cherry, No. 1 and 2	70 00	90 00	70 00	80 00
White ash, No. 1 and 2	24 00	35 00	30 00	35 00
Black Ash, No. 1 and 2	20 00	30 00	18 00	30 00
Dressing stocks	16 00	22 00	16 00	22 00
Picks, American inspection		30 00		40 00
Three uppers, Am. inspection		50 00		50 00

	Toronto.		Montreal.	
BRICK— ₩ M				
Common Walling		6 50		6 00
Good Facing		8 00		8 50
Sewer	8 50	8 00	8 50	9 00
Pressed Brick, Per M:				
Red, No. 1, f.o.b. Beamsville		15 00		
" " 2		13 00		
" " 3		9 00		
Buff		21 00		
Brown		24 00		
Roman Red		30 00		
" Buff		35 00		
" Brown		40 00		
Sewer		7 50		
Hard Building		6 00		
Roof Tiles		22 00		
Hip Tile (each)		20		
Ridge Tile "		60		
1st quality, f.o.b. at Port Credit		12 00		18 00
2nd " " " "		10 00		15 00
3rd " " " "		8 00		12 00
Hard building brick		6 50		
Ornamental, per 100	3 00	10 00		
SAND.				
Per Load of 1¾ Cubic Yards		1 25		1 25
STONE.				
Common Rubble, per toise, delivered		10 00		11 00
Large flat Rubble, per toise, delivered		14 00		18 00
Foundation Blocks, per c. ft.		30		50
Kent Freestone Quarries Moncton, N. B., per cu ft., f.o.b.		1 00		
River John, N. S., brown Freestone, per cu. ft., f.o.b.		95		
Ballochmyle	80	90	65	75
New York Blue Stone				1 05
Granite (Stanstead) Ashlar, 6 in. to 12 in., rise 9 in., per ft.				25
Moat Freestone			60	70
Thomson's Gatelawbridge, cu. ft.			75	80
Credit Valley Rubble, per car of 15 tons, at quarry		7 00		
Credit Valley Brown Coarsing, up to 10 inch, per sup. yard, at quarry	1 50	1 75	1 50	1 75
Credit Valley Brown Dimension, per cu. ft. at quarry		60		60
Credit Valley Grey Coursing, per super. yard, at quarry		1 00		1 00
Credit Valley Grey Dimension, per cu. ft., at quarry		45		45
Clark's N. B. Brown Stone, per cubic foot, f.o.b.		1 15		1 00
Brown Free Stone, Woodpoint, Sackville, N.B., per cub. ft.		1 15		1 00
Madoc Rubble, delivered, per toise	14 00	14 50	14 00	14 50
Madoc dimension floating, f. o. b. Toronto, per cubic ft.	30	32		
Cape Bauld, N. B., Brown Freestone		90		70
Cocaigne, N. B., Gray Freestone (olive-green)		90		70
OHIO FREESTONE, FROM THE GRAFTON STONE CO.'S QUARRIES.				
No. 1 Buff Promiscuous		90		1 00
No. 1 Buff Dimension		95		1 05
No. 1 Blue Promiscuous		60		70
No. 1 Blue Dimension		65		75
Sawed Ashlar, No. 1 Buff, any thickness, per cub. ft.		1 10		1 20
Sawed Ashlar, No. 1 Blue, any thickness, per cub. ft.		80		90
Sawed Flagging, per sq. ft., for each inch in thickness		06½		07½
Above prices cover cost freight and duty paid. For small lots add 5 to 10 cents per cubic foot.				
Quebec and Vermont rough granite for building purposes, per c.ft. f.o.b. quarry	33	1 50		
For ornamental work, cu. ft.	35	2 0		
Granite paving blocks, 8 in. to 12 in. x 6 in. x 4½ in., per M		50 00		
Granite curbing stone, 6 in. x 20 in., per lineal foot		70		
SLATE.				
Roofing (₩ *square*).				
" red		18 00		20 00
" purple		00		10 00
" unfading green		9 00		6 00
" black		8 00		5 50
Terra Cotta Tile, per sq		25 00		
Ornamental Black Slate Roofing		8 50		
PAINTS. *(In oil, ₩ lb.*				
White lead, Can., per 100 lbs.	6 25	5 50	5 50	6 00
" zinc, Can., " "	6 50	7 50	6 50	7 50
Red lead, Eng	4 00	5 00	4 50	5 00
" venetian, per 100 lbs	1 60	1 75	1 50	1 75
" vermillion	90	1 00	90	1 00
" Indian, Eng	10	12	10	12
Yellow ochre	5	10	3	5
Yellow chrome	15	20	15	20
Green, chrome	7	12	7	12
" Paris	20	25	14	20
Black lamp	15	25	12	25
Blue, ultramarine	15	20	12	18
Oil, linseed, raw, ₩ *Imp. gal.*	50	59	58	59
" " boiled "	53	63	62	63
" " refined, "	78	85	75	75
Putty	2¾	2½	2¾	2½
Whiting, dry, per 100 lbs	60	80	60	75
Paris white, Eng., dry	90	1 25	90	1 00
Litharge, Eng	4	5	4 50	5 00
Sienna, burnt	10	15	12	15
Umber, "	8¼	12	12	15
Turpentine	40			
CEMENT, LIME, etc.				
Portland Cements.—				
German, per bbl		3 25	2 55	2 65
London "	2 50	2 75	1 92	05
Portland Cements.—				
Newcastle "		2 50	1 85	1 95
Belgian, Josson, artificial	3 40	2 50	2 65	2 75
English, artifical, per bbl	2 60	2 90	2 55	2 65
Belgian, natural, per bbl	2 30	2 40	1 70	1 85
Canadian "	2 30	2 50	1 80	1 85
Roman "			2 00	2 25
Parian "	4 50	4 75	5 50	5 75
Superfine "	6 50	7 00	8 00	9 00
Hydraulic Cements.—				
Thorold, per bbl		1 50	1 25	1 50
Queenston, "		1 50	1 50	1 60
Napanee, "		1 50		1 50
Hull, "		1 50		1 50
Ontario, "		1 25		
Keene's Coarse "Whites"	4 50	4 75	4 50	4 75
Fire Bricks, Newcastle, per M	27 00	35 00	15 00	21 00
" Scotch "	27 00	35 00	19 00	21 00
Lime, Per Barrel, Grey		40		
" " White		50		
Plaster, Calcined, N. B		2 00		
" " N. S		2 00		2 50
Hair, Plasterers', per bag	80	1 00		
HARDWARE.				
Cut nails, 50d & 60d, per keg		2 75		2 75
Steel " " " "		2 85		2 85
CUT NAILS, FENCE AND CUT SPIKES.				
40d, hot cut, per 100 lbs		2 80		2 80
30d, " " "		2 85		2 85
20d, 16d and 12d, hot cut, per 100 lbs		2 90		2 90
10d, hot cut, per 100 lbs		2 95		2 95
8d, 9d, " " "		3 00		3 00
6d, 7d, " " "		3 15		3 15
4d to 5d, " " "		3 35		3 35
3d, " " "		3 75		3 75
2d, " " "		4 25		4 25
4d to 5d cold cut, not polished or blued, per 100 lbs		3 25		3 25
3d to 5d cold cut, not polished or blued, per 100 lbs		3 65		3 65
FINE BLUED NAILS.				
3d, per 100 lbs		4 25		4 25
2d, " "		4 75		4 75
CASING AND BOX, FLOORING, SHOOK AND TOBACCO BOX NAILS.				
12d to 30d, per 100 lbs		3 25		3 25
10d, " "		3 35		3 35
8d and 9d, " "		3 50		3 50
6d and 7d, " "		3 65		3 65
4d to 5d, " "		3 85		3 85
3d, " "		4 25		4 25
FINISHING NAILS.				
3 inch, per 100 lbs		3 60		3 60
2½ to 2¾ " " "		3 75		3 75
2 to 2¼ " " "		3 90		3 90
1½ to 1¾ " " "		4 10		4 10
1¼ " " "		4 50		4 50
1 " " "		5 00		5 00
SLATING NAILS.				
5d, per 100 lbs		3 60		3 60
4d, " "		3 60		3 60
3d, " "		4 00		4 00
2d, " "		4 50		4 50
COMMON BARREL NAILS.				
1 inch, per 100 lbs		4 25		4 25
⅞ " " "		4 50		4 50
¾ " " "		5 00		5 00
CLINCH NAILS.				
3 inch, per 100 lbs		3 60		3 60
2½ and 2¾ " " "		3 75		3 75
2 and 2¼ " " "		3 90		3 90
1½ and 1¾ " "		4 10		4 10
1¼ " "		4 75		4 75
1 " "		5 25		5 25
SHARP AND FLAT PRESSED NAILS.				
3 inch, per 100 lbs		4 10		4 10
2½ and 2¾ " " "		4 25		4 25
2 and 2¼ " " "		4 40		4 40
1½ and 1¾ " " "		4 60		4 60
1¼ " " "		5 25		5 25
1 " " "		5 75		5 75
STEEL WIRE NAILS.				

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

Iron Pipe:

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

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

Lead Pipe:

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

Discount, 30 % off in small lots.

Galvanized Iron:

Adam's—Mar's Best and Queen's Head:		
16 to 24 guage, per lb	4½c.	4¾c.
26 guage, "	4¾	5
28 "	5	5¼
Gordon Crown—		
16 to 24 guage, per lb	4¼	4½
26 guage, "	4½	4¾
28 "	4¾	5

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

Structural Iron:

Steel Beams, per 100 lbs	2 75	2 50
" channels, "	2 85	2 60
" angles, "	2 50	2 30
" tees, "	2 80	2 65
" plates, "	2 55	2 35
Sheared steel bridge plate		2 35

(Corrected up to September 9th)