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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.

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CONTRACTS OPEN.

GRIMSBY, ONT.—Allan Bros. will build a planing mill.

HARTLAND, N. B.—Shaw & Dibblee will erect a new store and warehouse.

PRESCOTT, ONT.—A by-law has been carried authorizing the expenditure of $5,000 on Victoria hall.

BONFIELD, ONT.—A R. C. rectory will be erected here, to cost $2,000, M. Gorman, jr., Pembroke, architect.

KINGSTON, ONT.—The building owned by the McMillan estate, which was destroyed by fire, will be rebuilt.

BROOKLIN, ONT.—The school house tower will be rebuilt. A. Roberts, architect, will have charge of the work.

POWASSAN, ONT.—Wm. Dodd, architect, North Bay, has prepared plans for a residence here for E. Clark, brick maker.

HALIFAX, N. S.—The Halifax Brewery Co., Ltd., have decided to rebuild the works recently destroyed by fire at Turtle Grove.

FREDERICTON, N. B.—The Reformed Baptists will erect a tabernacle at Brown's Flats, with a seating capacity for 2,000 people.

WINGHAM, ONT. — Granolithic sidewalks 10 feet in width are to be laid on each side of the Main street, for a distance of about 500 feet.

QUEBEC, QUE.—David Ouellet, architect, is preparing plans for reparations at the Christian Brothers school on des Fossies street.

MERRITON, ONT.—T. L. Wilson has purchased 10 acres of land adjoining his factory upon which he will erect a laboratory for experimental purposes.

BELLEISLE CREEK, N. B. — The Methodist congregation of the Springfield circuit will erect a new parsonage, to be completed at the end of the present year.

AMHERST, N. S.—The ratepayers have decided to issue debentures for $20,000 for the following purposes: Schools, $8,000; waterworks, $10,000; fire system, $2,000.

WOODSTOCK, ONT. — B. McNicol, chairman Board of Works, invites tenders until to-day (Thursday), for the construction of 9,000 lineal feet of board sidewalk.

BEDEQUE, P.E.I.—A movement is on foot to ask the local government to construct a bridge over Dunk river, between Murray's Island and Howatt's shore. The distance is 1,250 feet.

GODERICH, ONT.—By-laws have been carried authorizing the council to extend the waterworks system, to introduce a complete system of sewerage, and to install an electric light plant.

WALKERTON, ONT.—Engineers are surveying the route of the Huron & Ontario Electric railway. The work will be completed in about two months, and track laying will then be proceeded with.

VANCOUVER, B. C.—Application is being made for the incorporation of the Vancouver, Victoria and Eastern Railway & Navigation Co., to construct and operate a transcontinental line south of the C. P. R.

SANDRINGHAM, ONT.—Tenders for the construction of the Moore creek drain are invited by R. C. McGregor, Township Clerk, until the 1st of August. The estimated cost of the work is $7,459. Plans may be seen at the office of the clerk.

RENFREW, ONT.—B. Dillon, architect, is preparing plans for a business block, with offices and opera house above, for T. Hough.—MacKay & Guest, electric light owners, intend erecting an isolated water power plant and putting in another machine.

DARTMOUTH, N. S.—John W. Jago, secretary Dartmouth Ferry Commission, will receive tenders until the 15th of August for the construction of a ferry steamer, from plans to be seen at the offices of James Jacks, Glasgow, G. B., the Lockwood Mfg. Co., East Boston, U. S., and at the office of the above commission.

NORTH BAY, ONT.—It is contemplated to build a town hall and lock-up here.—Wm. Dodd, architect, is preparing plans for a two roomed high school.—Mr. M. Gorman, architect, of Pembroke, is preparing plans for two stores for R. Gorman, to cost $6,000.

LONDON, ONT.—The Southern Congregationalists have decided to build a new church, at a cost of $4,500.—W. H. Harding will build a brick cottage on Hyman street, to cost $1,400.—Ormsby

Graydon, C. E., asks tenders for brick work, carpentry, plastering, painting and electric lighting of the City Engineer's office.

ROSSLAND, B. C.—New York capitalists are said to have furnished $500,000 for the purpose of building a railway to North Port, just over the Washington line, a distance of 18 miles from Rossland, and probably a smelter will be erected there.

WINDSOR, ONT.—A deputation from this town is interviewing the Ontario government regarding powers to issue debentures for waterworks improvements. Several years ago the courts ordered the cities of Windsor and Walkerville to construct a commonin take pipe, and that Windsor should bear nine-tenths of the cost. It is now proposed to carry out the work, the cost of which has been estimated at $60,000.

OTTAWA, ONT.—The Dominion Cold Storage Co. has offered to build a cold storage warehouse here to cost $100,000, if the city will supply the site at a nominal rental for 21 years.—E. F. E. Roy, Secretary Department of Public Works, will receive tenders until the 7th of August for the supply of coal for the Dominion public buildings.—The Ottawa Rowing Club has asked the park commissioners to sell a site on the river front for the erection of a club house.

CHATHAM, ONT.—T. C. McNab, Secretary of the Board of School Trustees, will receive tenders until the 30th inst. for the erection of a brick school house. Plans may be seen at the office of T. L. Wilson & Son, architects.—The Lake Erie & Detroit River Railway Co. have given notice of application to the Dominion parliament to sanction the building of a branch line of railway in the town of Ridgeway and another in the town of Blenheim.

PEMBROKE, ONT.—J. L. Morris, architect and surveyor, is preparing plans and reporting on a sewerage system for the town of Arnprior. He is the engineer for the Pembroke Southern railroad, and has just made a preliminary survey to Golden Lake, twenty miles south of here. From Golden Lake they intend building to Bancroft, the terminus of the Iron and Bancroft railroad. In the near future they may build from Bancroft to Coe Hill, a distance of 15 miles, thereby getting a short route to Belleville.

MONTREAL, QUE.—Tenders are invited by Henry Holgate, manager Montreal Park & Island railway, for the masonry and foundation work for a bridge over the Back river. Plans at 17 Place d'Armes Hill.—Building permits have been granted as follows: one house, 24 × 40 feet, on Sanguinet street, stone and brick, for George Bail. J. H. Macduff, architect. Masonry, Chapleau & Lemay; carpenter and joiner's work, Geo. Bail. Estimated cost $3,000. One store and one tenement on St. Denis street for A. R. Archambault: Masonry, Latreille & Bros.; carpenter and joiner's work, Mr. Kelly. Two houses, 61 × 28 feet, on Laval avenue for Jas. Bondreau—carpenter and joiner's work, A. Latour.

ST. JOHN, N. B.—The survey of the Restigouche and Victoria railway is being proceeded with. The location of the first 35 miles from Campbellton will be completed by the end of August, when construction work will be commenced. Mr. O. Dwyer is engineer in charge.—A proposal is on foot to erect a monument to Sir Leonard Tilley. The details of the project will be made public in a short time.—The Board of Works, at a meeting held on Friday last, decided that the city should undertake the work of constructing the harbor works and wharf improvements at Sand Point. The City Engineer will superintend the work.—The Board of School Trustees have decided to invite tenders for sanitary appliances for the new high school building, also for a system of hot water or steam heating. Tenders will also be asked for the purchase of the remaining $23,000 of bonds.

HAMILTON, ONT.—A. W Peene, architect, is taking tenders this week for alterations to the Herald Printing Co.'s office, King street west.—Improvements are required in the sanitary arrangements of he jail building, to cost about $1,000.—A meeting of the promoters of the Hamilton, Ancaster & Alberton Electric Railway Co. was held in this city on the 15th inst., at which proposals were made for building the road.—Wm. and Walter Stewart, architects, have the following works under way: Alterations and additions to the Evans block, York street, for the D. Nicholson estate; alterations and additions to 35 King street west, for the same estate; re-fitting J. D. Climies' store, King street west; new steam and hot water heating for the general hospital, also new coal house; alterations and fitting up for offices of the Brown-Balfour building, and steam heating for same for Robt. Thomson, Esq.—R. Clohecy, architect, will receive tenders up to July 25th for alterations in De La Salle Institute.

WINNIPEG, MAN.—Among the improvements in charge of Mr. Walter Chesterton are the Ashdown retail store on Bannatyne avenue, the renovating of St. John's cathedral, stone foundation under a terrace on Edmonton street, with other modern conveniences to be added, and the erection of a residence for W. J. Tupper, on Armstrong's Point.—A brick block, three stories, with basement, will be erected on Main street by D. McDonald and R. Wyatt. Estimated cost $20,000.—The trustees of Maple street congregational church have under consideration the question of proposed improvements.—The local government engineers have located sites for bridges over the Pembina and Souris rivers.—The Bank of Hamilton has secured offices on Main street, near Lombard street, and the premises will be fitted up for banking purposes.—St. Marks church, Port Rouge, is to be improved. The plans are in the hands of Mr. Russell.—The City Engineer has reported that 750 barrels of cement will be required for the Main street bridge improvements.—The Board of Works have resolved to invite tenders for the following: $900 worth of sewer pipe; 250 cubic yards of stone; the construction of two catch basins on Charlotte street; the construction of a sewer on Nena street and a flume on Schultz street, and a 24 ft. block pavement on Stanley street.

TORONTO, ONT.—The Toronto Railway & Radial Co., which propose taking over the Toronto Belt Line Railway and converting it into an electric line, are applying for incorporation. Extensions are also contemplated to the various villages within a radius of 50 miles. Messrs. Dewart & Raney are solicitors for the company.—Ald. Gowanlock recently moved in the City Council that the City Engineer be instructed to prepare an estimate of cost of constructing a trunk sewer. The motion was lost—.Specifications are being prepared by the City Engineer for the widening of Queen street subway, preparatory to inviting tenders for the work.—Tenders are invited until the 29th inst., addressed to R. J. Fleming, chairman Board of Control, for the supply of two two-horse hose wagons and 3,650 feet of 2½ inch and 650 feet of 3 inch fire hose.—The following building permits have been granted: Thomas Walmsley, addition to 242½ Queen street east, cost $1,000; George Ross, detached brick dwelling, 102 Madison avenue, cost $4,000; James McLenaghan, detached two story and attic brick dwelling, 12 South Drive, Rosedale, cost $6,000. *Dick & Wickson, architects; E. Hooper,* mansard roof to Grand Union hotel, n.e. cor. Simcoe and Front sts., cost $2,800.

FIRES.

The residence of A. A. Richmond, clerk of Surrey, B. C., was burned on the 9th inst. Loss $3,500, no insurance.—The building at Kingston, Ont., owned by the McMillan estate, was gutted by fire on the 15th inst. Loss covered by insurance.—A portion of A. W. Spooner's copperine works at Port Hope, Ont., were destroyed by fire on Sunday last. The loss is about $4,000, largely covered by insurance.—A shingle mill at Dunlap Settlement, near Bathurst, N. B., owned by Nat. McNair, was burned on July 5th.—Louis McConnell's shingle mill at Van Vlack, Ont., has been burned. Loss $5,000; no insurance.

CONTRACTS AWARDED.

BROCKVILLE, ONT.—The Brockville Pressed Brick Co. are supplying the pressed brick for the new James street school.

UPTERGROVE, ONT.—The contract for a presbytery here, to cost $3,200, has been let to J. R. Eaton, of Orillia. Thomas Kennedy, Barrie, architect.

WALKERVILLE, ONT.—The Kerr Engine Company, of this town, have secured the contract for hydrants required for the waterworks system at Petrolea.

TILBURY, ONT.—O. K. Kippen & Scarff, bankers, of this place, were the purchasers of $10,000 of consolidated debentures. Premium, $1,072.17.

NEW GLASGOW, N. S.—W. P. McNeil, of this town, has received the contract for building an iron bridge, 61 ft. in length, with two pair iron cylinders, in Wilmot, Kings County.

SHERBROOKE, QUE.—Loomis & Sons have received the contract for Long's new factory. The building will be 100x50 ft., three storeys, first storey in stone and the other two in brick.

OTTAWA, ONT.—The Department of Railways and Canals have awarded the contract for the substructure of a bridge over the Trent canal at Auburn, near Peterborough, to Larkin & Co., of St. Catharines. The work will cost from $20,000 to $25,000.

VANCOUVER, B. C.—Robertson & Hackett have been awarded the contract for a two storey brick building, corner Hastings and Homer streets, for Harvey Haddon, of London, Eng., to be built from plans prepared by J. E. Parr, architect, of this city. The heating system will be put in by Leek & Co. Estimated cost, $13,000.

BROCKVILLE, ONT.—The James Smart Manufacturing Co. have been awarded the contract for placing the "Kelsey" warm air generators in the following buildings in this town: Wall street Methodist church; James street school; Dr. Horton's residence; W. H. Comstock's tenement; E. Smart's residence, and J. M. Gill's residence. They have also been awarded contracts for these heaters from many outside places.

GUELPH, ONT.—Geo. R. Bruce, architect, has let the contract for carpenter work for a residence for Mrs. Johnston, on Glasgow street, 45x32 ft., three storeys, to Mr. Cooke, of Rockwood.—Mr. W. T. Tanner has awarded the contracts for the erection of a two-storey pressed brick house, 40x22 ft., on Suffolk street, for Mrs. Worswick. The contractors are: Stone and brick work, Rundell & Foster; carpentering, John Beckman; tinsmithing, W. Sunley; plastering, T. Robinson; painting, Moffatt Bros.

HAMILTON, ONT.—The contract for three bridges on the line of the Toronto, Hamilton and Buffalo railway has been

given to the Hamilton Bridge Co.—F. J. Rastrick & Son, architects, have awarded contracts for the erection of a school house for section No. 6, township of Baiton, as follows: Jas. R. Bradt, mason and brickwork; John Mills, carpentry; Poole & Son, plastering, J. E. Riddle, galvanized iron work. Heating and seating not let.—R. Clohecy, architect, has awarded the contract for the erection of a residence for Chas. Martin, to cost about $2,500, to R. H. Biglowe, all trades.

WINNIPEG, MAN.—Tenders for sewers on Ellen and Qu'Appelle streets and Roslyn Place were received as follows: Dobson & Jackson, $1,353 (accepted); Kelly Bros., $1,439.—The contract has been awarded to Underwood & Hunter for a residence for Canon Coombes, of St. John's College. It will be of frame, on stone foundation, two storeys high. S. Frank Peters, architect.—The contract for pipe for setting hydrants has been awarded to the Vulcan Iron Works.—The tender of the Imperial Bank of Canada, at $126.35 for $100, has been accepted by the Provincial Government for $5,500of 5 per cent. 30-year bonds, to complete the court house and jail at Portage la Prairie.

MONTREAL, QUE.—Gamelin & Huot, architects, have awarded the contracts for one house on Mansfield street, Montreal Annex, for Wilfred Lajennesse, to Etienne Robert.—L. R. Montbriand, architect, has awarded the following contracts: reparations at the St. Louis of Mile End College, for the school commissioners—carpenter and joiner's work, Jos. Jeteau; plumbing and heating, Drapeau & Savignac; plastering not let.—Cox & Amos, architects, have awarded the following contracts for reparations and modifications of a church on Wood avenue, Westmount, for the syndicate of the Advent church: Masonry, Wighton & Morrison; carpenter and joiner's work, Jas. Shearer; roofing, Lessard & Harris; plumbing and heating, F. Horton; brick, Wm. McArthur & Sons; plastering, F. X. Descarries; painting and glazing, W. Young. Reparations of a house on St. James st., for the estate Chs. Boyer: Felix Sauvageau, all trades.—L. R. Montbriant, architect, has awarded contracts as follows for two houses on St. Andre street for G. W. Crossan: Masonry, Busher & Huberdeau; carpenter and joiner's work, W. Mercier; roofing, Montreal Roofing Co.; brick, Boucher & Huberdeau; plastering, E. Morache; painting and glazing, Desjardins & Dubois.—Arthur J. Cooke, architect, 43 St. Sacrament street, has let contracts as follows for alterations and an additional flat to 292 Upper Stanley street, for James Davidson: stonework, Wighton & Morrison; carpenter and joiner's work, Beckham & Scott; brick work, W. H. Boon; roofing, Campbell & Gilday; steel work, R. Donaldson & Son; plumbing and heating, R. Mitchell & Co.; plastering, Knott & Gardner; painting, Riordan Bros. Same architect has awarded contracts for a double tenement house on Columbia ave. as follows: Masonry, cut stone and brickwork, I. Lewis; carpenter and joiner's work, W. Swan; roofing, Geo. W. Reed; steel work, Dominion Bridge Co.; plumbing and heating, Geo. W. Creed & Son; plastering, Knott & Gardner; painting, Riordan Bros.; electric wiring, C. W. Henderson; also a double tenement on Columbia ave. for John Creed, to same contractors as above except carpenter work, which has been given to M. Desautels. For two summer kiosks on Lake St. Louis, Chateauguay, for W. G. Ross, the contractor for all trades is M. Desautels.—The Crown Pressed Brick Co., through their Montreal agent, E. F. Dartnell, is supplying the brick for the new Congregational church, Westmount, and for the additions to the Church of the Advent.

BIDS.

WINNIPEG, MAN. — The following tenders were received for asphalt paving on Donald, Hargrave and Kennedy streets and Assiniboine ave.: Barber Asphalt Paving Co., $115,488 with certain alternatives, without these $99,140; per square yard, $2.90. Kelly Bros, $81,634, per square yard $2.49, with Trinidad or Bermuda asphalt, with Utah asphalt, $80,304; per square yard $2.44. The Warren Scharff Asphalt Paving Co., $2.65 per square yard, totals varying with alternatives from $88,690 to $64,002. A. W. Godson, per square yard $2.49; total, Trinidad asphalt, $83,874. The city engineer was asked to report on the tenders.

NEW COMPANIES.

VANCOUVER, B. C.—Golden Cache Mining Co., incorporated; capital, $500.000. Promoters, W. R. Robertson, J. M. McKinnon, J. McQuillan, Wm. Munsie.

ROSSLAND, B C.—Ivanhoe Gold Mining Co., incorporated. The company is composed of Edwd. N. Bouche, D. W. Higgins, D. Campbell, A. M. Whiteside, C. F. Jackson, C. O. Redd.n, J. S. Clute, jr., of Rossland.

HAMILTON, ONT. — Cataract Power Company, incorporated; capital, $99,000. Promoters, Hon. J. M. Gibson, James Dixon, John Moodie, John William Sutherland, John Paterson, Edmund Brown Patterson, all of Hamilton.

TORONTO, ONT.—The Shipway Ash & Garbage Box Co., incorporated; capital, $20,000; to manufacture the Shipway ash and garbage box receivers. The company consists of T. H. Shipway, C. R. Shipway, H. L. Stark, and R. F. Williams of Toronto.

ROSSLAND, B. C.—The British Lion Milling & Mining Co., incorporated; capital $600,000. Trustees, Geo. A. Kirkup, W. G. Ellis, Geo. A. Williams and Wm. Stables.—The C. & C. Mining Co., incorporated; capital, $500,000. The trustees are McIver Campbell and D. G. Marshall, Vancouver, and J. H. O'Leary, Rossland.

BUSINESS NOTES.

The Erie Iron Works Mfg. Co., of St. Thomas, will be sold by auction on the 22nd of July.

R. & S. Small, tinsmith, Dunham, Ont., have dissolved partnership. The business will be continued under the name of Small Bros.

Matthew McCarthy and John Kilbride, plasterers, Montreal, have formed a partnership, and will do business under the name of McCarthy & Kilbride.

FREEZING AND CEMENT MORTARS.

The results of a large number of experiments recently carried out with a view of determining the effect of freezing on cement mortars were published recently. Most of the specimens were tested transversely, but many experiments in tension were also made. In order to reproduce the conditions of actual work as closely as possible, the various specimens were caused to set under a pressure corresponding to the average weight of a course of masonry 18 in. deep. These specimens measured 5 in. in length by 1 in. square in cross section. They were tested on a 4 in. span with a central load, and, after breaking, the long fragment was again broken on a 2½ in. span. Six brands of cement were used, and were mixed with screened sand in various ratios, and then allowed to set at low temperatures. Both salt and fresh water were used in gauging the specimens. The conclusions arrived at, based on over 6,000 results, is 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 when setting, and its cohesion may be entirely destroyed by immersion in water which becomes frozen round it. Salt water presents this disintegration to a large extent, but seems to *have an injurious effect on the strength.* 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 cements gave very satisfactory results, as its surface did not disintegrate, and its strength was increased by the freezing. Portland cement is injured less proportionately as the percentage of cement *in the specimens is reduced.* Lime mortar is ruined by alternate thawing and freezing, but fairly good results can be obtained in the case of brick masonry when the mortar is kept frozen for some time after laying.

Paintings that have been injured by contraction of the coats, and the varnish of which is traversed by fine cracks that render the picture indistinct, are restored in the following manner: A vessel filled with alcohol is gently warmed, and air is blown through it. The air is thus impregnated with alcoholic vapor, and is conducted by a tube directly upon the picture. The ascending vapor condenses upon the surface of the picture and renders the parts to a slight degree soluble, so that they flow together and the flaws disappear.

THE STRENGTH OF COMMON MORTAR.

Common mortar is a substance which is too commonly left to the "discretion" of those talented assistants who describe themselves as day laborers. Little wonder, then, that in setting and binding properties, the mortars which they succeed in making show such bad results. Possibly, too, very few of those who use mortar could give any good reasons for arranging the proportion of the ingredients in one way rather than in another. Hence the following experiments, by one who has tried to find out what is best, may be of interest.

Herr Beschetznick, whom we understand to be an Hungarian expert, has been investigating common mortars, feeling that too much attention has been devoted to the higher cements by scientific men in all countries. He tried various kinds of lime, and slacked them all under the same conditions, afterwards allowing them to mature for a week. Mixtures of lime thus treated and ordinary building sand with water were then prepared, and tested after they had been allowed to set for one, three and twelve months.

The result of the tests showed that poor limes set more quickly than fat limes, but that the strength of the latter was relatively greater when the mixtures used were poor in lime. Thus 1:5 mixtures of fat lime had nearly the same strength as 1:4 mixtures of poor lime.

An American, A. S. Cooper, has also been investigating the question of mortars, turning his attention to the influence of the character of the sand upon them. He used sands of varying fineness and character of grain, and after numerous experiments arrived at the following conclusions, namely:—

1. Other things being equal, a fairly coarse sand, for example, one passing through a 12 in. sieve (12 wires to the mesh), and caught on a 16 in. sieve, gives mortars of higher tensile strength than do finer sands.

2. This effect of size of grain disappears with sands fine enough to pass a 40-mesh sieve and caught in a 60-mesh sieve. Sands finer than this give similar results.

3. The character of the surface of the grains is of moment. Mere sharpness of grain is not the only point to be considered, for an extremely sharp sand may have a smooth surface on each facet, and a moderately rough surface is preferable.

All the above results, namely, those of Beschetznick and of Cooper, are of direct practical value, and should be made use of by those who have to use mortar, and are desirous of employing only a thoroughly trustworthy mortar, which will stand the test of time.

There ought to be as much unanimity of opinion concerning the strength of mortars as there is, or is supposed to be, concerning the strength of other building materials. Architects can turn to tables which are recognized as standards, and find at a glance the strength of the chief materials that are used. Similarly, the civil engineer can calculate from standard tables the strength of the various kinds of iron, steel, etc., to a nicety. The building of a bridge is no more important than that of a house, and there ought to be no guess-work about the one any more than there is about the other. It is certainly high time that the composition of the various cementitious materials used in building should be defined, and that the strength of such materials of known composition should be ascertained, so that nothing should be left to mere chance, or to the intelligent discretion of those talented assistants to whom we alluded in our opening paragraph.—British Clayworker.

USEFUL HINTS.

Shellac is an excellent thing for destroying stains on whitewashed ceilings.

A door knob that works with a combination similar to a safe knob is a late invention. By its use locking with a key becomes unnecessary.

Cadmium yellow cannot be mixed with pigments containing lead or copper as a base, because it is a sulphide, and will turn black in such admixtures.

A recently patented fire and water proof paint composition consists of equal portions of yellow ochre, sulphur, brown mineral, salt, and resin intimately mixed together. The iron oxide of the brown mineral and the yellow ochre combine to impart an impervious and bright glossy property to the paint. The mixture of the several ingredients mentioned is introduced into a proportionately large quantity of coal tar, and the whole is boiled until the resin has become completely melted. The inventor states that the sodium chloride combines with the tar to form a compound not easily ignited, and the resin combines to form a glazed and hardened surface.

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

TAKING MEASUREMENTS.

Mr. Owen B. Maginnis, in the Illustrated Carpenter and Builder, says:—

To measure the distance between two walls or in openings as framing for doors, windows and recesses, the best method is to use two rods by sliding them along until the ends touch the opposite side, thus obtaining the exact width. If in door openings, as for jambs and windows, the width should be taken at the top, bottom, and middle, so as to verify and approximate the average width should there be any variation. Similarly in regard to heights, as heights of doors, windows, ceilings, floor beams, etc., the two rods are safest, as they cannot bend, and if held with both hands and slid apart the exact distance will be ascertained, as it is a very simple matter to measure the length of the rods. Two 2 ft. rules are also of great utility in inside measuring.

MUNICIPAL DEPARTMENT

THE FINANCIAL MANAGEMENT OF WATER WORKS.*

In studying the questions relating to water rates Mr. Coffin tabulated the available statistics of the water works in 52 cities and towns, mainly in New England. The very large cities were left out, the largest city on the list having a population of 90,000 and the smallest town 1,450 inhabitants.

For the purpose of comparing these systems on a common basis Mr. Coffin obtained the total economic cost of running each system by adding together three items—viz., the actual annual cost of maintenance as reported, 4 per cent. on the cost of construction for interest, and 1½ per cent. on the cost of construction for depreciation. The actual interest paid was not taken, as that would not be a fair basis of comparison, as in some cases the bonds are paid and in others a higher rate is paid on old bonds. Similarly the depreciation fund was computed instead of taking the amount paid into the sinking fund. From the sum of these three items is subtracted the amount paid by private consumers and the amount that the water department should receive on the basis of three gallons per capita at 15 cents per 1,000 gallons for public purposes. The difference of the expenditures and these two sources of revenue is the cost of fire protection to be raised by taxation. An examination of the tables shows that of the 52 systems there are 14 in which the revenue from private consumers is sufficient to meet the annual expenditure and 19 in which the private revenue and that computed for public purposes, except fire protection, equals the expenditures. There are 33 in which from 0.8 to 57.3 per cent. of the total expenditure must be met by taxation. In four of these cases this percentage exceeds 50. These results are sufficient to show whether or not water works are self-supporting and sufficiently high. The amount to be raised by taxation in 39 places where water is pumped averaged $42.74 per hydrant. The minimum was 80 cents and the maximum $106. The percentage of taxation to total expenditure for these hydrants ranged from 0.80 to 57.30, the average being 28.86. The cost of construction per consumer of these works averaged $38.41, ranging between $10.50 and $80.40. The tables show roughly that the cost of construction per capita is greatest in those systems that raise the greatest per cent. by taxation.

No solution that considers all the conditions of the problem has been advanced to adjust rates to the requirements of expenditure or in fixing those for new works. The only method known to Mr. Coffin is the usual one of comparison of rates without regard to cost of construction per capita, cost of water per 1,000 or 1,000,000 gallons, etc., which is irrational and gives no assurance that the revenue will be approximately equal to the requirements.

It is possible to estimate quite closely the expenditures, especially in existing works, but the question is how to adjust rates to meet expenditures. In existing works experience furnishes a guide, but there is none for new works. There can hardly be a theory advanced for the adjustment of fixture rates. It is possible that with water sold by meter, rates could be devised that would bear some relation to the revenue required. Data is lacking for this at present. In the tables is given the yearly cost per capita based upon the number of consumers—that is, the number of persons living on the pipe line. This annual cost per capita is perhaps the most scientific unit for comparing the yearly economic cost of water works. This unit of cost seems to have no law of relation to the number of consumers, but is largely influenced by the cost of construction per capita, and in a less degree by the consumption of water per capita. The fixed charges of interest and depreciation are approximately 75 per cent. of the total cost of maintaining water works, therefore the item of first cost is the controlling factor in the yearly expense account. While not conclusive, a guide may be had from a consideration of the different rates given. The minimum of the yearly cost in pumping systems is $1.22, the maximum $5.62, and the average $2.58. The cost per 1,000 gallons based upon the total expenditure and total amount pumped ranges from $0.065 to $0.257, averaging $0.115. This cost is for total pumping and does not represent the cost of water that can be delivered and registered at the meters of consumers.

After quoting Mr. Brackett's paper referred to above in regard to the large percentage of water lost between the pumping station and the taps of the consumers, Mr. Coffin states that in a case that came under his notice where the pumpage was 300,000 gallons, but 75,000 gallons was used by the consumers. A large portion of the leakage was located on a few streets, but there was no surface indications. As such cases may be more common than is generally suspected, the desirability is suggested of having recording instruments on standpipes and reservoirs, and some means of measuring the draft in gravity systems, so that its amount and distribution throughout the day may be known.

While the tables show that there are very few works whose rates are not high enough when a sufficient sum is appropriated for fire protection, rates should not be lowered without carefully studying needs of the future and the possibility of improvements in the works. More attention must be given in the future to the quality of the supply not only as a whole, but in cases where the supply is good for only portions of the year. Sand filtration is now practicable, and should be adopted in such cases. Consumers are entitled to the best water that can be had at any reasonable cost. Many distribution systems are inadequate to furnish a suitable fire protection. Many believed to be sufficient have never happened to meet contingencies that may occur at any time, and have never been intelligently studied. A curve was plotted from the statistics of average daily per capita consumption from 75 towns having from 1,000 to 1,000,000 consumers living on pipe lines. The consumption per capita seems to follow a general law of increase with increasing populations. The formula of the curve is $40\,(N \times 0.001)_{0.14}$, where N represents the total number of the consumers.

* Abstract of a paper by Freeman C Coffin, M. Am, Soc. C. E., read before the New England Water works Association at the annual convention at Lynn, Mass., June 1, 1896.

BERLIN'S NEW SEWAGE SYSTEM.

Berlin has dealt successfully with the drainage question. Until about a quarter of a century ago the disposal of sewage was effected in primitive fashion; open drain courses, badly built and with inadequate fall, ran through many of the streets, discharging finally into the River Spree, for whole condition contamination would be far too mild a word. A commission was appointed which, after visiting various countries, especially England, with the view of practically studying different systems, reported in favor of sewage irrigation on land at a distance from the city. The flatness of the plain on which Berlin is built would not allow of any gravitation scheme, and consequently it was found necessary to adopt steam pumping. For the same reason the sewage could not all be collected at one spot, and it was therefore decided to divide the city into twelve drainage areas. The ground at the seven sewage farms was well suited for the purpose, consisting only of sandy wastes, then growing only stunted firs and birches, but now converted into fertile fields. The total area of the land which could be devoted to sewage irrigation is 22,500 acres; only about 11,000 acres are at present needed. The following extract is from Dr. Legge's account of these Berlin farms: "No deleterious effect has been noticed on the health of those living on the sewage farms, and, indeed, at some of them, as at Blankenburg and Malchow, the city has built hospitals for convalescents, for consumptives, and for women recovering after child-bed, and the patients seem to thrive in them as well as they would anywhere else."

The question of whether the germs of typhoid fever and cholera pass through the soil into the drainage water has naturally formed a subject of inquiry, but many bacteriological examinations conducted specially with the view of clearing up this point, have answered the question in the negative. Until 1892 the laborers working on the sewage farms were remarkably free from typhoid fever, although in 1889 Berlin was visited by a severe epidemic; in 1892 a few cases occurred among some farm workers, who were believed to have drunk largely of the effluent from the farm, but in these instances other possible sources of infection could not be excluded. It is satisfactory to note that, notwithstanding the enormous cost of working these Berlin sewage farms, the expenses have, in most years, been covered by the sale of the produce, and in one year (1889) the surplus amounted to $11,511.

The town of Ingersoll announce in our advertisement columns their desire to purchase a second-hand road roller.

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

ENGINEERS

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: There can be no improvement reported in the demand for supplies on city account. Orders are coming in for some lines with a little freedom, but the situation shows no improvement. In cut nails there is a little more doing, while on galvanized iron an advance of 10 cents per 100 lbs. is announced. The demand for glass is light, and only for immediate wants. Paints and oils show more activity.

MONTREAL: Although no striking change has taken place, the condition of the building supply trade is more favorable. There is a moderate volume of orders being placed. Heavy metals remain unchanged, and advices from abroad report a marked firmness. The arrivals of cement for the past week were 1,850 barrels English, as against 5,950 English and 4,606 Belgian for the previous week, which makes a total to date of 31,870 English and 24,561 Belgian. The call is principally for small lots, but the tone of the market is steady and no cutting is indulged in.

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
1 inch clear			40 00	45 00
1 x 10 and 12 dressing and better		20 00	22 00	18 00 20
1 x 10 and 12 mill run		16 00	17 00	19
1 x 10 and 12 dressing		20 00	22 00	18 00
1 x 10 and 12 common		13 00	14 00	8 00 10 00
Spruce culls		10 00	11 00	8 00 10 00
1 x 10 and 12 culls		9 00	10 00	9 00
1 inch clear and picks		28 00	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
1 inch strips, common		11 00	12 00	10 00 12 00
1¼ inch flooring		16 00	17 00	12 00 15 00
1¼ 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

VALUATIONS.

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 ft	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.

1¼ in. flooring, dressed, F M	26 00	30 00	28 00	31 00
1¼ 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		16 00		
" " 2		14 00		
" " 3		9 00		
Buff		21 00		
Brown		24 00		
Roman Red		30 00		
" Buff		35 00		
" Brown		40 00		
Sewer		7 50		
Hard Building		6 00		
Roof Tiles		22 00		
Hip Tile (each)		20		
Ridge Tile "		60		
1st quality, f.o.b. at Port Credit		12 00		18 00
2nd " " " "		10 00		15 00
3rd " " " "		8 00		12 00
Hard building brick		6 50		
Ornamental, per 100	7 00	10 00		
SAND.				
Per Load of 1½ Cubic Yards		1 25		1 25
STONE.				
Common Rubble, per toise, delivered		14 00		14 00
Large flat Rubble, per toise, delivered		18 00		18 00
Foundation Blocks, per c. ft.		50		50
Kent Freestone Quarries Moncton, N. B., per cu ft., f.o.b.		1 00		
River John, N. S., brown Freestone, per cu. ft., f.o.b.		95		
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		8 00		
Credit Valley Brown Coursing, up to 10 inch, per sup. yard, at quarry		1 75		3 25
Credit Valley Brown Dimension, per cu. ft. at quarry		60		75
Credit Valley Grey Coursing, per superficial yard	1 50	2 00		2 15
Credit Valley Grey Dimension, per cubic foot		60		75
Clark's N. B. Brown Stone, per cubic foot, f.o.b.		1 15		1 00
Brown Free Stone, Woodpoint, Sackville, N.B., per cub. ft.		1 15		1 00
MadocRubble, 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 60	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.*	54	59	58	59
" " boiled	57	63	62	63
" " refined, "	78	85	75	75
Putty	2¼	2½	2¾	2½
Whiting, dry, per 100 lbs	75	1 00	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, "	8½	12	12	15

CEMENT, LIME, etc.

Portland Cements.—				
German, per bbl		3 75	2 55	2 65
London "	2 50	2 75	1 92	2 05
Portland Cements.—				
Newcastle "		2 50	1 85	1 95
Belgian, Josse'n, 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 [illegible]		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:

	Toronto.	Montreal.
Iron pipe, ¼ inch, per foot	6c.	6c.
" " 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 60
" plates, "	2 55	2 35
Sheared steel bridge plate		2 35

(Corrected up to July 22nd)