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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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The tunnel of the Toronto, Hamilton and Buffalo railway at Hamilton, Ont., has been completed. It is 1,900 feet long, and cost about $350,000.

The durability of wet timber is something remarkable. Recently, according to a Vienna paper, one of the piles supporting the bridge built across the Danube by the Emperor Trajan, was taken up. Although driven seventeen centuries ago, it showed no change, save that it was petrified to the depth of three-quarters of an inch. The chestnut, beach, elm and oak piles on which stand the Savoy Palace, London, are undecayed. They were put in place in the latter part of the thirteenth century.

CONTRACTS OPEN.

ARNPRIOR, ONT.—An addition is to be built to the Campbell House.

NOBLETON, ONT.—The Methodists are preparing to build a new church.

FORT WILLIAM, ONT.—It is probable new docks will be built here next summer.

ATHENS, ONT.—The Hornerites have purchased two lots on which to erect a church.

COLLINGWOOD, ONT. — Considerable building is in sight for the coming summer.

WINNIPEG, MAN.—It is proposed to erect a new school house on Wellington street, ward 3.

AYLMER, QUE.—An American firm is said to be considering the erection of a large hotel here.

HALIFAX, N. S.—Tenders are now being received for fourteen closed cars for the Halifax tramway.

MALAKOFF, ONT.—W. G. Mackey is preparing to erect a brick residence, corner Main and Sherwood streets.

ALMA, ONT.—J. S. Johnson invites tenders until Saturday, the 29th inst., for the erection of a two-story brick residence.

PETERBORO', ONT.—Tenders are being called for the erection of new buildings for the Peterboro' Lock Manufacturing Co.

CHESLEY, ONT.—Moore & Wallace's sash and door factory has been damaged by a boiler explosion to the extent of $2,000.

NIAGARA FALLS, ONT. The proposed extension of the sewerage system has been approved of by the Provincial Board of Health.

MONCTON, N. B. It is probable that Mr. Patrick Gallagher will build a new brick front and otherwise remodel the Queen's hotel.

MORDEN, MAN.—A number of private residences are projected this summer. The Hudson Bay Company will likely erect a brick block.

GUELPH, ONT.—Donald McLaren, lot 6, concession 1, Guelph Township, will receive tenders until the 29th inst., for the erection of a bank barn.

ALEXANDRIA, ONT. It is said that the Alexandria Manufacturing Co., whose factory was recently destroyed, will rebuild a new factory double the size of the old one.

TRURO, N. S.—Applications will be received by the town clerk until Wednesday, the 22nd inst., for the position of Superintendent of Waterworks and Streets.

PRINCE ALBERT, ONT. Rev. Geo. Moore, rector of St. Albans Episcopal church here is endeavoring to raise funds wherewith to erect a new $6,000 church edifice.

QUEBEC, QUE.—Over thirty plans have been received for the monument to be erected on the Dufferin Terrace, in honor

of Samuel de Champlain, founder of Quebec. A selection will not be made for some weeks.

HULL, QUE.—Mr Hibbard, C E., has been instructed to prepare plans for a new steel bridge to be built at Eddyville. The plan will be submitted at the next council meeting.

DUNDEE, MAN.—Isaac Murphy will receive tenders until the 22nd inst., for the erection of a school house for the Rossmere school district. Plans may be seen at 548 Main street, Winnipeg.

PORTAGE LA PRAIRIE, MAN.—T. C. Silverthorn, architect, is preparing plans for a brick block and other substantial buildings. He reports the outlook for building operations next summer as good.

LANCASTER, ONT.—D. P. Tobin will build a 2 storey brick hotel, with hot air heating, work will commence early in the Spring.—Wm Henderson will build a store and dwelling, to be wood incased with brick.

WOODSTOCK, N. B.—The construction of the Woodstock and Centreville railway is likely to be commenced shortly. Wm Mahon, President of the company, is having surveys made and is advertising for sleepers.

WINDSOR, ONT.—The Y. M. C. A. directors have adopted plans and specifications for a new building.—Mr. Newman, C. E., has been instructed to prepare plans for the construction of a second well at the waterworks.

SASKATCHEWAN, N. W. T.—Mr. Mc Dougall, M. P. P., is urging the government to grant a subsidy for the extension of the Manitoba and Northwestern railway from its present terminus at Yorkton, westward towards Prince Albert.

WHITNEY, ONT.—The Presbyterians have decided to build a church during the coming summer. Mr. James Devenney has been appointed chairman of the building committee. The Roman Catholics are also preparing to build a church.

DIGBY, N S.—The town council has decided to ask the co-operation of St. John in an effort to secure assistance from the government for the erection of a deep water wharf and other facilities for a line of steamers to this port from Boston.

NORMAN, MAN.—It is expected that work will be commenced early in March on a steel bridge across the Winnipeg river, between Norman and Tunnel island, to be built by the Ontario Government. The Rat Portage council will build approaches thereto, to cost $1,000.

BARRIE, ONT.—G. G. Smith invites plans from architects until the 6th of March for alterations and extension of Central School, including heating and ventilating.—Eden Smith and Eustace Bird, architects, will receive tenders until March 1st for erecting a Methodist church in Minesing.

BELLEVILLE, ONT.—Plans are being prepared for a new addition to the Deaf and Dumb Institute, the cost of which is estimated at $30,000. It is anticipated that the work will be done during the coming summer by the Ontario Government.—The city are about purchasing a steam road roller.

BRANDON, MAN.—The General Hospital Board have waited upon the local government urging a grant towards the erection of an isolated building for the General Hospital. Plans for a modern structure were submitted, the cost of which would be about $8,000. The Government promised consideration.

ST. CATHARINES, ONT.—The Port Dalhousie, St. Catharines & Thorold Electric Street Railway Co. has decided to build eight miles of overhead construction and two miles of track as soon as the weather permits.—The Board of Directors of the General Hospital have decided to build an addition to the building.

NAPANEE, ONT.—At a congregational meeting of the Presbyterian church, James Birrell, chairman of the board of management, presented three plans showing the different improvements contemplated, costing $2,500, $4,700 and 6,000. The majority present were in favor of the improvements costing $6,000. Another meeting will be called shortly to take definite action.

LONDON, ONT.—Plans for improvements to the Western Fair property have been prepared. The building for the dairy, machinery, cattle and other exhibits will be enlarged and improved, and an entirely new carriage building erected.—Benjamin Higgins proposes erecting new buildings on his property on Dundas street. Contracts have not yet been awarded.

STRATFORD, ONT.—The County Clerk is advertising for a site for the proposed House of Refuge.—The Provincial Board of Health have approved of the extension of the sewerage system in this town. The trunk sewer will be completed during the present year.—David G. Baxter, architect, will shortly call for tenders for a house for Mr. Aaron Buck, of Mitchell, Ont., to cost about $1,800. The house will be built of solid brick, with hot air heating, etc.

KINGSTON, ONT.—The City Engineer has recommended the construction of an artificial stone sidewalk on north side of Princess street, at a cost of $1,252.76.—The City Council have succeeded in securing a grant of $15,000 by the Dominion Government for the erection of a drill hall in this city.—The Property Committee are asking for tenders for heating and ventilating the new school building about to be erected.

MEMRAMCOOK, N. B.—Tenders will be asked immediately for the new Memorial Hal for St. Joseph's College. The structure will be 80×55 feet, two stories high, built of Caledonian stone of a yellow, olive color. The walls will have a rough face and the roof is to be of slate. The first floor is to be divided into four apartments. The upper floor will consist of a hall with a seating capacity for 900 persons. The ceilings and walls will probably be covered with pendlaw metal. The building will be heated by hot air and lighted by electricity. Rev. A. D. Cormier is steward of the college. Besides the Memorial Hall, the authorities intend adding another story to the main building, but the date when this work is to be begun has yet to be determined.

HAMILTON, ONT.—The building committee of the Board of Education have been authorized to invite tenders for the Collegiate Institute. William Stewart & Son, architects.—The Dominion Government will be petitioned by the City Council to have the Beach canal deepened to an equal depth with the Welland canal, and to carry out other improvements.—City Engineer Haskins estimates that the cost of diverting the Wentworth street sewer and carrying it to the Ferguson ave. flume will be about $41,900, the excavating costing $30,500, and the piping and piling $11,400.—The markets committee will have plans prepared at once for the erection of a shelter 300 feet in length, to cost about $6,000.—Building permits have been granted as follows: James McInerney, store and two dwellings southwest corner John and Simcoe streets, cost $4,000; H. B. Vaughn, two-story brick dwelling corner of Emerald and Robert streets, cost $1,200.

MONTREAL, QUE.—A deputation representing the Harbor Commission last week interviewed the Premier at Ottawa regarding improvements to the Montreal harbor. They were assured that legislation would be introduced at the present session to enable them to make financial arrangements for carrying out the work.—The Harbor Commissioners will oppose the proposed scheme of the South Shore Suburban Railway Co., to build a bridge across the St. Lawrence river.—At the annual meeting of the Ottawa River Navigation Co., it was stated that the Great Northern Railway Co. will shortly extend their line to Grenville, and from there, with a bridge over the Ottawa river, will connect with the Carillon and Grenville and Canada Atlantic railway.—The Railway Men's Christian Association are considering the erection of a new building. Mr. Blachaller is president of the association.—Taylor & Gordon, architects, are calling for tenders until the 22nd inst. for the addition of new buildings to the Protestant insane asylum.

ST. JOHN, N. B.—Mayor Robertson has delivered a message to the Common Council, suggesting that a bridge be built across the head of the harbor at Navy Island, and that a systematic scheme of harbor improvement be entered upon, the object being to provide needed facilities for a very largely increased trade. The co-operation of the I. C. R. and C. P. R., and the Provincial and Federal Governments will be asked.—Extensive improvements are to be made to St. Peters church, for which plans are now being prepared. The towers will be completed and a new front put in. Work will be commenced about May 1st.—Engineer Murdoch has submitted a report recommending the construction of an iron pipe from 3 inches to 4 inches in diameter to Sand Point. He also states that a tank could be erected on the City wharf and another on the C. P. R. wharf at a cost of $3,000. Another alternative would be to lay an 18 inch iron pipe from Lancaster street to connect with the pipes at Sand Point, at a cost of $3,800.—It is stated that increased harbor facilities will be required to retain the winter port business and meet competition.

TORONTO, ONT.—The City Council will probably apply to the Legislature for power to issue debentures for $200,000 for the completion of the new city building, without submitting the proposition to the people.—Debentures will be issued for $56,000 to cover the cost of the city's share for the construction of the York street bridge.—Mr. E. J. Lennox, architect, has submitted the following statement of funds necessary for completing the new city buildings. To complete Elliott & Neelon's stonework contract, $110,000; electric plant, $15,000; laying out grounds. $5,000; furnishing buildings, $30,000; contingencies, $10,000.—Building permits have been granted as follows: Robert Armstrong, 42 Carlton st., one and one-half story bk. stable and alterations to buildings, cor. Yonge and St. Albans st., cost $1,100; J. W. McMichael, 160 Borden st., two story and attic bk. house, 157 Howland ave., cost $2,500; T. Eaton Co., 3 story and basement bk. addition to south end James street warehouse, and 3 story and basement bk. addition to west end Queen street warehouse, cost $20,000.

OTTAWA, ONT.—The Ottawa & Aylmer Railway & Bridge Co. will receive tenders until the 10th of March for the supply of 12,000 standard railway ties of hemlock, cedar and tamarack, to be delivered before April 10th, between Hintonburg and Britannia. Dimensions, 8 ft. long, 6 in. thick and not less than 6 in. face.—Plans have not yet been adopted for the new wing to the Protestant Hospital.—The directors of the Ottawa Gas Co. will receive tenders until the 21st inst., for the excavation, building and construction of a brick gas holder tank, 85 feet diameter, with house and roof, to be completed by July 1st.—J. H. Balderson, Secretaty Department Railways and Canals, invites tenders until Saturday, March 21st., for

the construction of 4 miles of canal on the Peterborough and Lakefield division of the Trent canal. Plans may be seen at the above department or at the superintending engineer's office, Peterborough. —Robert Surtees, city engineer, invites tenders until the 26th inst., for the supply of cedars, planks, hardware, explosives and vitrified fire clay sewer pipe required by the corporation during the current year.—Mr. Devlin asked in parliament whether it was the intention of the government to grant aid during the present session towards building a combined highway and railway bridge near Nepean Point, and connecting Ottawa with Hull. The government replied that the matter was now under consideration.—Mr. Cockburn last week presented petition to Parliament praying that no extension of time be granted to the Nipissing and James Bay railway, except on condition that 10 miles be constructed this year and that the line be completed to Lake Temiscamingue by July, 1898.—Large quantities of stone are being taken out for the Parry Sound car shops in Ottawa East, work on which will be commenced in the spring. —A syndicate has been formed of Ottawa capitalists to erect a new theatre. The proposed lessees are said to be Messrs. Sparrow and Jacobs, of Toronto.

FIRES.

McMillan's steam saw mill at North Sydney, N. S., was burned on the 14th inst. Loss $8,000; no insurance.—Campbell & McNab's roller mill and grain shed at Douglas, Ont., was burned recently. Loss $5,000. — The English Church at Listowel, Ont., was almost completely destroyed by fire on the 13th inst. Loss partially covered by insurance.—R. B. Ferguson's large furniture store at Regina, N. W. T., has been completely destroyed by fire. Loss $15,000. — A building at Oshawa, Ont., owned by E. I. Rowse, was recently badly damaged by fire.—A. Belanger's marble works at St. Roche, Que, were burned on the 15th inst. Loss partially covered by insurance. —W. Dalrymple's residence at Tilsonburg, Ont., has been burned. — The residence of A. Hindes, at Oshawa, Ont., was consumed by fire on Friday of last week. Partially insured. The flax mill owned by Heiderman & Trachsel, near Shakespeare, Ont., was burned on Wednesday night. Loss $2,500, no insurance. —The Presbyterian Church at Westport, Ont., was burned on the 17th inst. Loss, $3,000; insurance $2,000.—At Rosebank, Man., on Sunday last an elevator belonging to Thos Nichol, of Wawanesa, was destroyed by fire. Loss $7,000, mostly covered by insurance.

CONTRACTS AWARDED.

ST. JOHN, N. B.—The Board of School trustees have accepted the tender of Blair & Co. for the purchase of $8,000 of debentures.

WINNIPEG, MAN.—The contract for the erection of the Bell Telephone Co.'s new building on Thistle street has been awarded to Kelly Bros & Co.

ST. THOMAS, ONT.—The contract for the construction of the new bridge west of Belmont has been awarded to the Central Bridge Company, of Peterborough, at $398.99. Geo. Ponsford, of St. Thomas, has received the contract for constructing the concrete abutments, at $599.

TORONTO, ONT.—A. B. Ormsby & Co. have been awarded the contract for a large quantity of galvanized iron shingles and siding for buildings on Yonge street dock.—The tender of the Bertram Engine Co., of this city, for the supply of 2,350 feet of 6-inch steel or cast iron pipe, for the new conduit, has been recommended for acceptance. Price, $31,620.

TUCKERSMITH, ONT.—Wm. Chapman has let contracts for a new two-storey brick residence as follows: Brickwork, Frank Guttridge, carpenter work, Wright & Edge, of Seaforth, painting, Mr. Stacey, of Hensall.—Contracts for a new residence for Robert Murray have been awarded as follows: Brickwork, Mr. Patterson, of Hensall: carpenter work, Mr. Kidd; painting, Mr. Stacey, of Hensall.

BUCTOCHE, N. B.—James Barnes, M. P. P., is the contractor for the Central railway extension from Chatham to Newcastle. He has about completed the foundations for the Howe truss bridge over Salmon river. This bridge will be 500 feet long and will consist of four spans of 125 each. There will be two other bridges, one at Ironbound Cove, a trestle bridge 300 feet long, and the other at Newcastle, a Howe truss span 125 feet long and 300 feet of trestle work. It is expected the extension will be completed and ready for operation in November next.

NEW COMPANIES.

VANKLEEK HILL, ONT—The Temiscamingue Lithographic Mining Co., applying for incorporation; capital stock $100,000; to mine and manufacture lithographic stone, etc.

MONTREAL, QUE. — Non-Magnetic Asbestos Co., incorporated; capital, $15,000. Promoters, John H. Seed and Francis P. McCall, of Brooklyn; Cassius H. Wells, of Huntingdon; William Sclater, William T. Costigan, and Edward A. Cowley, of Montreal.

TORONTO, ONT.—Booth Copper Co., incorporated; capital $25,000. The subscribers ar , G. Booth, A. G. Booth, C. H. Booth, Joseph Wright, Toronto, and W. E. Booth of Chicago.—The Empress Gold Mining Company, limited, has been incorporated, with a capital of $100,000. The subscribers are of the Thunder Bay District.

HALIFAX, N. S.—Golden Mining Group Co., incorporated; capital, $100,000; objects, prospecting and searching for minerals in Nova Scotia; building dams, water courses, mills, crushers, houses, tramways, and plant; for winning and milling ores, constructing and maintaining telephone and telegraph lines in connection with its undertaking. The promoters are: A. Hayward, of Waverley, F. S. Andrews, of South Essex, Massachusetts, Henry Hugh Bell, A. M. Jack, and Hector McInnis, of Halifax.

BUSINESS NOTES.

Thomas Keaough, painter, Ottawa, is dead.

J. Devine & Co., plumbers, Montreal, have dissolved.

Alfred Blais, tinsmith and plumber, Montreal, has assigned.

J. C. Rowley, painter, Vancouver, B.C., is reported to have left the place.

Wilfred Barbau, plumber, Ottawa, is reported to have assigned to W. A. Cole.

Louis Vanesse, tinsmith, St. Maurice, Que., is reported to have left the place.

Boivin & Wilson have formed a partnership in Montreal to deal in plate glass.

A. Blondin and O. Daoust have formed a partnership as plumbers at St. Hyacinthe, Que.

The Hull Cement Works, at Hull, Que., will be resumed by C. B. Wright & Co. at an early date.

E. C. Mount has been registered proprietor of the plumbing business of E. C Mount & Co., Montreal.

The liabilities of D. A. McKenzie & Co., varnish manufacturers, Toronto, are placed at $10,000, and assets $24,000.

The Diehl Manufacturing Co., King street west, Toronto, manufacturers of mantels, grates and tiles, have gone into liquidation. Liabilities estimated at $18,000.

Wm. Simpson, builder, Toronto, has made an assignment to David Blackley, caused by the decline of building trade and failures of other concerns. Liabilities $6,500; assets nominally the same.

FIREPROOF MATERIALS.

An important inquiry is about to be undertaken in New York with the object of determining the value of various materials used in the construction of fireproof buildings. The experiments will be on a grand scale, and will resemble the actualities of a fire as nearly as possible. The committee will consist of representatives of the New York Architectural League, the American Society of Mechanical Engineers, and the Tariff Association of New York. The plant will include a gas producer to supply the fuel gas, so arranged to receive a spray of petroleum in case higher temperatures may be required than those obtained from the combustion of gas alone. Furnaces for testing full-sized columns and floors will be erected. The foundations of these furnaces will consist of side walls with an arch between them, thus making a safe place for the introduction of the gas pipes and for the hydraulic cylinder. On the top of this foundation will be erected a room built of the materials to be tested. The columns will be loaded by pressure from the hybraulic cylinder, and, during the tests, a safe load, such as is prescribed by the building laws of the city, will be put upon it. The arches for the floors will be loaded by dead weight. Every precaution will be taken by the committee to make the tests uniform as regards temperature, drought, cooling by water streams, &c., so that the results may be comparable.

LOCK MAKING AND LOCK BREAKING.

At the Goldsmiths' Institute, New Cross, Mr. H. W. Chubb delivered a lecture on "Locks." Having dealt with his subject historically and shown designs of beautiful German and Italian workmanship, he caused to be thrown on the screen a series of views, some of which excited much interest. In the first place was displayed, by means of moving slides, the working of Chubb locks, one of which the lecturer had previously exhibited to the audience, and had shown, by way of indicating its delicate construction, that it could not be worked by a key differing from the proper one by only the hundredth part of an inch in a small detail. Next he illustrated the mechanism of "detectors," which not only defeat the designs of the pick lock, but retain evidence of his ineffectual industry. Among the photographs shown by the lantern was one of a strong room, 50 feet long and weighing 40 tons, made for a Scotch bank. Its door was 4½ inches thick, and this, Mr. Chubb said, was perhaps a record for England, though in America solid steel doors of over 8 inches in thickness were known. In that country, it appears, lockmakers have even more formidable antagonists than are to be met with on this side of the Atlantic. Nitro-glycerine having been poured into keyholes and locks thereby blasted, the expedient has been adopted of a door that has no hole or chink of any sort on its face. Then how, it would be asked, was the lock turned? As could be seen from one of Mr. Chubb's views, there is an ingenious combination of clocks and springs on the inner side of the door, which will only open at a time that was appointed when it was shut. The lecturer also threw some light on burglarious methods in this country. A photograph was shown of the sets of tools taken from an hotel thief who was caught on premises in Covent Garden, and Mr. Chubb drew special attention to two of his implements. One was a pair of long nosed pliers, useful for turning a key that has been left in its place after the door had been locked from the inside. The other was a long thin rod having a hinge in the middle, so that, after the instrument has been inserted through a keyhole, the front portion drops at right angles, and becomes a lever for drawing back door bolts. Concerning the exquisite workmanship and materials of the equipment of three house-breakers surprised in a city post-office Mr. Chubb had much to say, "though why," he added, "they should have provided themselves with such splendid tools I do not know, for the ordinary post-office safe might be opened with a stout sardine-knife."

Subscribe for the Architect and Builder.

RULES FOR CONCRETE WORK.

The following is taken from a paper in the Journal of the Association of Engineering Societies, having the title "Concrete Construction on the Illinois and Mississippi Canal," by Mr. J. W. Woermann, and reprinted in the Engineering Record, (Jan. 11). These rules were compiled by Capt. W. L. Marshall

"(a) All massive concrete-work should be divided into sections by vertical planes at right angles to the longest dimensions or on approximately radial lines, if curved to determine in advance the planes of weakness along which cracks due to contraction in setting or to changes in temperature shall take place.

"(b) These sections must be built in successive horizontal layers, as thin as practicable, each layer being well rammed in place before the previously-deposited layer shall have had time to partially set. This rule calls for continuous work, from base to coping, day and night, if necessary, and the work must be rubbed smooth on the top surface and completed without cessation of operations.

"(c) There must be no definite plane or surface of demarcation between the facing and the concrete backing, but the facing and the backing must be deposited in the same horizontal layers and rammed in place at the same time. As far as practicable, the matrix or mortar of the concrete should be homogeneous from face to back of wall. It is permissible to increase somewhat the proportion of cement in the mortar near the face, in order to give greater strength, but the cement must be the same as in the concrete mass. No mixture of cement and lime, of cements different qualities, should be made. Diverse cement concretes should be connected by dovetails.

"(d) No plastering or finishing of surfaces, other than sifting sand and cement on the surfaces, if too wet, and rubbing hard with a float, is allowable, or any practice that develops planes or surfaces of weakness other than the vertical planes already noted.

"(e) The concrete or mortar shall be mixed with no more water than they will carry without quaking in ramming; they shall be deposited immediately after mixing; and shall be kept well shaded from the sun and supplied with water, at least at the surface, until well set."

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

MUNICIPAL DEPARTMENT

LOCATING A PUBLIC WATER-SUPPLY.

By Daniel W Mead

The source of a public water-supply is one of the principal controlling factors in the design of a public water-works system. On the elevation at which water can be obtained depends the possibility of a gravity system or the necessity of pumping works. And, if the latter are necessary, the elevation further determines the class of pumping engines which must be used. On the quality of the supply depends the necessity of filtration, clarification, softening, etc., and on its freedom from present or possible future pollution depend the freedom of the community from the possibility of epidemics and the degree of vigilance with which the supply must be guarded. On its quantity depend the necessity of storage reservoirs and the expensive line of public works which this necessity involves. In fact, it may be stated that the selection of a source of supply is the paramount question in the design of a water-works system, and on it, perhaps more than on any one feature of the works, depends its financial and practical success.

Of the larger cities of the United States it is safe to say that the supply of at least fifty per cent. of them is entirely unsatisfactory, and the supply of a large proportion of the remaining number is far from what it should be. No question is, in fact, giving more trouble in its solution at the present time than the question of the source of the water-supplies of the cities of the United States. This, to a considerable extent, is unavoidable. A city has a limited choice of possible sources, and from such sources the problem often is to select the least objectionable. Again, supplies which may have been satisfactory at the inception of the works have been radically changed in character by the settlement of the country. The trouble is also due, in many instances, to a failure, in the original designing of the system, to properly consider the hydrological resources of the localities. Superficial examinations alone are made. The resources of a locality are examined as though they were isolated phenomena, whereas they are a part of a general system which, if studied and considered as a whole, would throw more light on the question and lead to a broader understanding of local resources and often to a more intelligent selection and design of the special system considered. The lakes, streams, and watersheds are self-evident, as are the ground waters which supply the common wells of each community, and these alone are commonly investigated. The deeper sources, when such exist, are often unconsidered or overlooked, though they sometimes offer the cheapest means of securing pure and wholesome supplies. Intelligent design demands that due consideration be given to each possible source, and that the items of purity, quantity, cost, future extension, and protection from present or future contamination shall have each its due weight in determining choice.

To thoroughly comprehend the problem involved in the selection of a public water-supply, it is necessary to consider in detail the hydrology and hydro-geology of the entire region. The following discussion of the water supplies of southern Wisconsin and northern Illinois will serve to illustrate the extent and character of the necessary lines of study and inquiry.

The rainfall, to which ultimate source all available supplies may be traced, is exceedingly variable in quantity, and its careful study must precede the considerations of most questions of water-supply, and is especially important when limited watersheds are considered for surface supplies.

The ultimate disposal of the rainfall is modified by climate, temperature, vegetation, and geological conditions, which differ, not only with the locality, but with the season, and previous relative humidity. The rainfall is partially re evaporated. A portion is absorbed by vegetation and utilized in plant growth and transpiration from plant surfaces. A large additional percentage flows away in the streams, while the balance sinks into the soil, furnishing the dry weather flow of streams, the reservoir from which plant life draws its necessary supply during the rainless periods, and the waters which saturate the underlying geological strata.

The yearly distribution of the rainfall largely influences its ultimate distribution. When it is evenly distributed through the year, a larger proportion is absorbed by vegetation, imbibed by soil and rocks, and evaporated, and a smaller flows away in streams. Where the rainfall is concentrated in short periods, a larger percentage flows away in streams as flood waters, and a smaller is appropriated in other ways. The variation in the amount which may be assimilated by vegetation or evaporated during a short period is limited. So to a less degree is the imbibition of soils and rocks. For these strata, if once saturated, force the water to flow away as flood waters. A fall of an inch per hour may produce a considerable flood, especially with no vegetation and with frozen ground. The same fall distributed over twenty-four hours, with vegetation at its best and low ground water, may be scarcely noticeable in the flow of streams.

The relative amount of the total rainfall which may find its way into any one of the channels mentioned depends most largely, however, on geological conditions. The rate of inclination and nature of the surface, influencing the rapidity of the passage of waters over the surface, have a most important influence on the amount of water which flows away in streams or is lost through one of the other channels. With slight slope and high porosity the waters may cease entirely to appear in water-courses, but all be either evaporated, assimilated, or sunk into porous strata. The geology of southern Wisconsin and northern Illinois, as it relates to the distribution of the waters of this region, may be described as follows: This entire region is underlain by Archæan rocks of unknown thickness, which, as far as our knowledge goes, may be regarded as the foundation rocks on which the overlying deposits rest. Among the Archæan rocks of Wisconsin are found the earliest of known rocks, and from these have been formed, directly or indirectly, all later formations.

Since the beginning of geological history, the same agencies that are now at work pulling down the land surface and filling up the sea have been at work, aided or hindered by the great variations in climate. The rains soften and wear the rocks' surface, and cause the decomposition and disintegration of the most lasting rocks. The sea tumbles the rocks into the surf, and grinds them into sand and pebbles. The accumulated work of these agencies through ages has sufficed to pull down continents and build up deposits, which have formed new extents of land surface, and which in their turn have been disintegrated and destroyed to form new and later deposits.

In this way the Archæan deposits were worn and disintegrated and formed the extensive beds of Potsdam sandstone which underlie almost the entire area under consideration, except that small portion where the Archæan rocks themselves still show their outcrop above the surrounding deposits. The Potsdam deposit consists essentially of sandstones derived from the broken quartz grains of the decomposed granites and allied rocks. Variations more or less extensive in the position of land surface and the condition of deposition gave rise to the series of deposits which lie above the Potsdam, and which are all of more or less importance in the question of water-supply.

It is, however, unnecessary for our purpose to enter on a detailed history of the geological developments of this territory. It is sufficient to know that the land gradually rose from the sea, until, at the end of the Carboniferous period, it was all above the sea-level.

The topography of this region at the beginning of the Quaternary age differed greatly from the present rolling prairie land which makes up most of this area. In its stead, rugged hills and deep ravines marked the landscape. The rocky hillsides were largely bare, and a light soil existed only in the valleys. The Mississippi river flowed in the same general course that it now occupies, but at a relatively lower level of from one to two hundred feet. The Lake Michigan basin was then a wide, deep valley, through which flowed a river draining an extended territory, probably including the valleys of Lakes Superior and Huron. From the southern extremity of the present Lake Michigan, it flowed in a southwesterly direction to its outlet in the Mississippi river. During the Quaternary age there were epochs of great cold, during which the vast accumulations of snow and ice in the north were unmelted by the short summer heat. Great glaciers were formed, which pushed down from the northward, covering most of this region except southwestern Wisconsin and northwestern Illinois.

This irresistible ice flood overran valleys and hills, and covered most of this area to a depth of perhaps several thousand feet. The hills were planed and rounded off, and the ice flood filled the valleys deeply with the detritus pushed before it and carried within it. Vast floods of water came from their melting fronts, and caused successive deposits of various drift materials. The depths of these deposits in various places vary from nothing on the hilltops of the driftless area to three hundred and fifty feet at Janesville, Wis., in the old canon of the Rock river.

(To be Continued.)

Send for a copy of the second edition of the CANADIAN CONTRACTOR'S HAND-BOOK. Price, $1.50; to subscribers, $1.

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: No improvement can be reported in the general market for builders' supplies. The import glass trade shows the most activity, but as yet is not active. Paints and oils also meet with some demand. Plumbers' supplies are very restricted, particularly for city trade. Galvanized iron, iron pipe and soil pipe and fittings are steady, but devoid of special features.

MONTREAL: Hardware has witnessed some activity in the past week. In glass and paints and oils business is up to the average for the season of the year. The demand for cement continues slow, and the market dull and featureless.

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
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 00
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	32 00	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
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
1¼ inch flooring	16 00	17 00	12 00	15 00
XXX shingles, sawn, per M				
16 in	2 40	2 50	2 60	2 60
XX shingles, sawn	1 40	1 50	1 60	1 70
Lath	2 00			1 50

VALUED 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	3 00	12 00	3 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		22 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 sticks	16 00	22 00	16 00	22 00
Picks, American inspection		30 00		40 00
Three uppers, Am. inspection		50 00		50 00

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		14 00		18 00
2nd " " " "		12 00		15 00
3rd " " " "		8 00		12 00
Hard building brick		6 50		
Ornamental, per 100	3 00	10 00		

P. O. & DON VALLEY.

Red A		18 00		24 00
Red B		16 00		20 00
Red C		13 00		17 00
Trojan and Corinthian		21 00		28 00
Pompeiian		22 00		29 00
Athenian and Egyptian		25 0		31 00
Tyrian		35 00		41 00
Sicilian		40 00		45 00
Roman		35 00		40 00
Carthaginian		40 00		45 00
Ornamental	30 00	100 00	30 00	100 00
Common inside		6 00		
Hard sewers		7 50		
Vitrified pavers		16 00		22 00

SAND.

Per Load of 1½ Cubic Yards		1 20		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 25		1 00
Brown Free Stone, Woodpoint, Sackville, N.B., per cub. ft.		1 25		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		

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

No. 1 Buff Promiscuous		70		85
No. 1 Buff Dimension		75		90
No. 1 Blue Promiscuous		55		70
No. 1 Blue Dimension		60		75
Sawed Ashlar, No. 1 Buff, any thickness, per cub. ft.		90		1 05
Sawed Ashlar, No. 1 Blue, any thickness, per cub. ft.		75		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 fough 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	2¾	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 25	2 55	2 65
London "	2 50	2 75	1 92	2 05
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
Portland Cements.—				
Belgian, natural, per bbl	2 30	2 40	1 70	1 8
Canadian "	2 30	2 50	1 80	1 8
Roman "			2 00	2 2
Parian "	4 50	4 75	5 50	5 7
Superfine "	6 50	7 00	8 00	9 0
Hydraulic Cements.—				
Thorold, per bbl		1 50	1 25	1 5
Queenston, "		1 50	1 50	1 6
Napanee, "		1 50		1 5
Hull, "		1 [illegible]		1 5
Ontario, "		1 25		
Keene's Coarse "Whites"	4 50	4 75	4 50	4 7
Fire Bricks, Newcastle, per M	27 00	35 00	15 00	21 0
" Scotch "	27 00	33 00	19 00	21 0
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, 5cd & 6cd, per keg		2 50		2 1
Steel " " " "		2 60		2 35

CUT NAILS, FENCE AND CUT SPIKES.

40d, hot cut, per 100 lbs		2 55		2 15
30d, " " "		2 60		2 20
20d, 16d and 12d, hot cut, per 100 lbs		2 65		2 25
10d, hot cut, per 100 lbs		2 70		2 30
8d, 9d, " " "		2 75		2 35
6d, 7d, " " "		2 90		2 50
4d to 5d, " " "		3 10		2 70
3d, " " "		3 30		3 10
2d, " " "		4 00		3 60
4d to 5d cold cut, not polished or blued, per 100 lbs		3 00		2 60
3d to 5d cold cut, not polished or blued, per 100 lbs		3 40		3 00

FINE BLUED NAILS.

3d, per 100 lbs		4 00		3 60
2d, " "		4 50		4 10

CASING AND BOX, FLOORING, SHOOK AND TOBACCO BOX NAILS.

12d to 30d, per 100 lbs		2 50		2 60
10d, " "		2 80		2 70
8d and 9d, " "		2 95		2 80
6d and 7d, " "		3 10		3 05
4d to 5d, " "		3 30		3 20
3d, " "		3 70		3 60

FINISHING NAILS.

3 inch, per 100 lbs		3 10		2 95
2½ to 2¾ " " "		3 25		3 10
2 to 2¼ " " "		3 40		3 25
1½ to 1¾ " " "		3 60		3 45
1¼ " " "		4 00		3 85
1 " " "		4 50		4 35

SLATING NAILS.

5d, per 100 lbs		3 35		2 95
4d, " "		3 35		2 95
3d, " "		3 75		3 35
2d, " "		4 25		3 85

COMMON BARREL NAILS.

1 inch, per 100 lbs		3 75		3 35
⅞ " " "		4 25		3 60
¾ " " "		4 75		4 35

CLINCH NAILS.

3 inch, per 100 lbs		3 35		2 95
2½ and 2¾ " " "		3 50		3 10
2 and 2¼ " " "		3 65		3 25
1½ and 1¾ " "		3 85		3 45
1¼ " "		4 50		4 10
1 " "		5 00		4 60

SHARP AND FLAT PRESSED NAILS.

3 inch, per 100 lbs		3 75		3 45
2½ and 2¾ " " "		4 00		3 60
2 and 2¼ " " "		4 20		3 75
1½ and 1¾ " " "		4 40		3 95
1¼ " " "		5 00		4 60
1 " " "		5 50		5 10

STEEL WIRE NAILS.

Steel Wire Nails, 75 % discount from printed list

Iron Pipe:

Iron pipe, ⅛ inch, per foot		6c.		6c.
" " ¼ " "		7		7
" " ⅜ " "		8½		8½
" " ½ " "		12		12
" " ¾ " "		17		17
" " 1 " "		24		24
" " 1¼ " "		30		30
" " 1½ " "		43		43
" " 2 " "				

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; 30 and 10 % off in ton 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 Feb. 19th)