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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.

VOL. 7.

JANUARY 14, 1897

No. 50.

THE CANADIAN CONTRACT RECORD,

PUBLISHED EVERY THURSDAY

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

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TENDERS WANTED

Sealed tenders will be received by the undersigned, on behalf of the County of Huron, until 4 O'CLOCK P. M. on SATURDAY, THE 23RD OF JANUARY, inst.,

For Rebuilding the Bannockburn Bridge of Steel or Iron.

The bridge is to be 80 feet long between the abutments; the floor to be 16 feet wide. The bridge is to be supported on four cylinders three feet in diameter and ten feet long, to be filled with concrete, the floor and joists to be of rock elm.

Site about two miles from Brucefield station on the L. H. & B. Ry.

To be completed on or before the 17th of August, next. All further information may be had by enquiry. The lowest or any tender not necessarily accepted.

JOHN ANSLEY,

County Commissioner.

Wingham, Jan. 5th, 1897.

CONTRACTS OPEN

LAKE DORE, ONT.—A church will be built next summer on Mr. Jacob Griffith's property.

SUSSEX, N. B.—The municipality of Kings County have selected a site for a poor house.

SHAWVILLE, QUE.—A local company proposes putting in a plant for electric street lighting.

HULL, QUE.—Mr. Hamel, C. E., has been engaged to prepare plans for a new separate school.

MILLBANK, ONT.—A new school will be erected or improvements made to the present building.

LEAMINGTON, ONT.—The rumor is current that a new post office will be erected here next summer.

ST. JOHN, N. B.—The City Council will call for tenders for timber for the proposed new wharves.

PARRSBORO, N. S.—A local company is being organized here to put in a plant for electric street lighting in the spring.

INNERKIP, ONT.—Tenders for the erection of a cheese factory are invited until the 15th inst. Address J. R. Edwards.

VANCOUVER, B. C.—G. R. Maxwell, M. P., is endeavoring to secure the construction of a railway from Rossland to the coast.

ROBSON, B. C.—Ruelle & Halleck, formerly of Seattle, Washington, will erect a saw mill here, with a daily capacity of 25,000 feet.

STURGEON FALLS, ONT.—The rate-payers voted on a by-law on the 11th inst. to provide funds for the purchase of an electric light plant.

WINDSOR, ONT.—The Rankin home-stead between Windsor and Sandwich will shortly be torn down to make room for the proposed new sanatorium.

HAMILTON, ONT.—The International Radial Railway Company will make an application for a bonus of \$65,000 towards the construction of an electric railway to Guelph.

FREDERICTON, N. B.—The City Council have still under consideration the purchase of a road plant.—A proposition has been made to the council to install an electric fire alarm system.

LENNOXVILLE, QUE.—Tenders for rebuilding the bridge near Capelton known as the Wilson bridge, will be received up to noon on Saturday, the 16th inst. For particulars address W. W. Baker.

CORNWALL, ONT.—The Ontario Pacific Railway Company will apply at the next session of parliament for power to extend the period for the completion of their unconstructed lines and bridges.

FORT WILLIAM, ONT.—It is stated that a separate school will be erected next summer, while a public school is also spoken of. The outlook for building is regarded

as favorable, over a dozen dwellings being contemplated.

QUEBEC, QUE.—The Trades and Labor Council have requested the City Council to grant a contract for street lighting for two years only, at the expiration of which time it is urged that the city install an electric light plant.

DIGBY, N. S.—Dr. C. W. Hutchings and E. Mason White, of Boston, state that they have purchased property here, 200 x 400 feet in size, and will in February begin the construction of the new hotel, which will have a fine large office, spacious parlors and dining rooms and 100 sleeping apartments.

WINNIPEG, MAN.—The Railway Committee of the Privy Council at Ottawa last week considered the application of the city of Winnipeg to erect an overhead bridge at Salter street across the C. P. R. tracks. The committee decided that an order should be issued as soon as the details are agreed upon.

MONTREAL, QUE.—The Board of Trade have passed a resolution requesting the Grand Trunk railway to establish their general offices in the city. Should the resolution be acted upon, which is somewhat doubtful, a new building would be required.—Gamelin & Huot, architects, are preparing plans for a country residence to be erected at Varennes, for A. Simard, notary.

NELSON, B. C.—A company has been organized here, with a capital stock of \$20,000, to put in an electric light plant. The work of construction will be commenced as soon as the water rights have been secured from the government. The company will order one 5,000 light machine, step up and step down transformer, long distance system that will supply 2,200 volts in town; also one 50-light arc machine.—George Cassidy, of Vancouver, will probably establish a saw mill here.

VICTORIA, B. C.—F. E. Ward, of Spokane, has applied to the British Columbia government for permission to construct and operate a railway from a point at or near Ashcroft or Kamloops to Barkerville, in the Cariboo county.—A memorial will be presented to the provincial government asking that an exploratory survey be made of the country between the Stickeen river and Teslin lake, through which it is proposed to build a railway to give access to the Yukon territory.

LONDON, ONT.—The Wharnciffe road sewer plans are now being prepared, and tenders for the work will shortly be asked.—The following building permits have recently been issued by the City Engineer: Walter Gould, story and a half brick dwelling, north side Lorne avenue, between Adelaide and Elizabeth streets, cost \$1,000; F. W. Montrose, brick veneer cottage on east side Ontario street, between Princess avenue and Elias street, cost \$700; Geo. Arnott, brick veneer story and a half dwelling, east side On-

tario street, between Princess avenue and Elias street, cost \$800; Y. F. Mossop, brick veneer one and a half story residence on Queen's avenue, between Ontario and English streets, cost \$2,000; Robert Heard, two story brick veneer house, Adelaide street, north of Princess avenue, cost \$1,000.

TORONTO, ONT.—The City Engineer will recommend the renewal in the spring of a number of worn-out cedar block pavements.—Mr. William Davies, of the Wm. Davies Company, has subscribed \$10,000 towards the erection of the new Baptist church on Tecumseh street.—It is said that nineteen houses will be built in East Toronto in the spring, five on Kemilworth avenue, one on Waverley road, three on Lee avenue, five on Balsam avenue and three on Sassafras avenue. The latter will be built by Mr. James Beatty. Mr. Lyon will build two houses, one on Birch avenue. East Toronto councillors are agitating for an improved system of lighting, and in all probability electricity will be decided on.—The Privy Council at Ottawa has granted an order permitting the city to construct a bridge over the Don river at Cherry street.—Building permits have been granted as follows: Charles Powell, dwelling, No. 28 Trinity square, cost \$2,500; alterations to No. 33 Alice street, cost \$1,000; Mellard Estate, three brick fronted dwellings, Nos. 102, 102½ and 104 Palmerston avenue, cost \$2,100.

OTTAWA, ONT.—The doctors who have resigned as members of the Protestant hospital will, it is said, erect a new hospital, plans for which will be prepared at once. Among those concerned are Drs. Wright, Cousens, Powell and others.—E. L. Horwood, architect, has been instructed to prepare plans for a structure to be erected by the Sun Life Assurance Company at the corner of Sparks and Bank streets. It will contain stores on the main flat and offices above.—Tenders are invited by the Department of Public Works, addressed to E. F. E. Roy, secretary, until Friday, the 29th inst., for the extension of the breakwater at Margareville, Annapolis County, Nova Scotia, according to a plan and specification to be seen at the post office, Margareville, and at the above department.—Tenders are also asked by the Public Works Department until Monday, the 8th of February, for the several works required in the construction of a heating apparatus for the court house at Moosomin, N. W. T. Plans may be seen at the court house, Moosomin, and at the above department.—Tenders for the addition to the Protestant hospital are invited by the committee until the 18th inst. Mr. A. C. Hutchison, of Montreal, is the architect.—The plans for the new C. Ross Co. building at the corner of Sparks and Metcalfe streets have been adopted by the directorate. The building will cover the whole lot, and will be five stories high, with basement.—A suggestion has been made that the city purchase a 100 h. p. electric motor with rotary pump mounted on a light flat trolley car, as protection against fire.—Citizens are urging the construction of the workshops and roundhouses of the Ottawa, Arnprior and Pary Sound railway.—Notice is given that application will be made to parliament next session for a bill to incorporate the Manitoba and Pacific Railway Company, to construct a railway from a point on the line of the Northern Pacific and Manitoba Railway Company at or near Belmont, to Lethbridge, thence by the Crow's Nest Pass through the Rocky Mountains and beyond to some point on the Pacific coast north of the International boundary line. Notice is also given that application will be made for a bill to incorporate the Winnipeg, Duluth and Hudson Bay Railway Company, to construct a railway from a point on the south boundary line of Manitoba,

thence northerly and westerly to Winnipeg, thence to Lake Winnipeg, opposite Big Island, across Big Island and Black Island to the east side of the Lake, and to deep water on Hudson Bay.—Incorporation is being asked for the Canada Western Telegraph & Telephone Company, to construct works indicated by the name. The promoters are Osborne Plunkett, Vancouver, B. C., R. G. Tatlow, Vancouver, J. C. Armstrong, New Westminster, G. and F. Corbould, New Westminster.—The announcement has been made that the C. P. R. are considering the erection of a large station building at the head of Bank street.

FIRES.

The sash and door factory owned by Joseph Paquette, at the corner of Lacroix and Perthiers street, was badly damaged by fire on Monday last. The loss will probably reach \$40,000, partially covered by insurance.—The cheese factory at Newton, Ont., owned by Hugh Jack was burned last week. The loss is covered by insurance.—The premises at Riviere du Loup, Que., occupied by the Peoples' Bank of Halifax, and Messrs. Poulcot & Poulcot, was completely destroyed by fire recently. Loss on building fully covered by insurance.—Christ church at Tamworth, Ont., was badly damaged by fire a few days ago.—Ursuline convent at Roberval, Que., was burned to the ground on the 6th inst. The buildings were valued at \$75,000.—The Queen's hotel at Wallaceburg, Ont., owned by Frank Hanning, was destroyed by fire on Tuesday last.

CONTRACTS AWARDED.

TORONTO, ONT.—The York County Council have awarded the contract for the construction of a bridge at York Mills to W. J. Hill and Mr. Bailey. The price is said to be \$4,200.

QUEBEC, QUE.—Contracts for rolling stock for the electric railway have been awarded. The cars will be built by the Ottawa Car Co., the motors and electrical apparatus by Ahearn & Soper, of Ottawa, and the car trucks by the Taylor Electric Truck Co., of Troy, N. Y.

FORT WILLIAM, ONT.—William Veal has given the contract to F. Miller, contractor, for the erection of a two story residence on Heron street, the work to commence in the spring. The main building will be 20 x 26 ft. in size, with an addition 12 x 20 ft., and will contain six large rooms.

YARMOUTH, N. S.—Contracts in connection with the Coast railway have been closed with Mr. Chas. R. Reid, of Yarmouth, for combination passenger and freight stations at Argyle and East Pubnico, also for flag station at Pleasant lake and tool-houses at Belleville and Argyle. Contracts have also been made with Curry Bros. & Bent, of Bridgetown, for freight room additions to Tusket and Belleville stations. Buildings of similar design, though somewhat larger, will be built at Lower Argyle and Pubnico Head, plans for which are now ready.

MONTREAL, QUE.—J. B. Resther & Sons have awarded contracts as follows for four houses, forming six tenements, corner Prince Arthur and Hutchison streets, for the Estate Masson: Masonry, Boucher & Huberdeau; brick, Jos. Beland; carpenter and joiner's work, Lambert & Son; roofing, plumbing and heating, D. Ouimet; plastering, Ephrem Morache; painting and glazing, T. A. Gauthier.—Edward Maxwell, architect, has let contracts as follows for one house to be erected on Metcalfe avenue, Westmount, for Geo. S. Plow: Masonry, Heggie & Stewart; carpenter and joiner's work, Labrecque & Mercure; brick, O. Deguise; painting and glazing, N. Belair.

—Gamelin & Huot, architects, have awarded contracts as follows for four houses to be erected on Quiblier street for the Estate Masson: Masonry, Boucher & Huberdeau; brick and plastering, Boucher & Huberdeau; carpenter and joiner's work, Soucisse & Brouillette; plumbing, David Ouimet; electric wiring, etc., Canada Electric Co.; painting, A. Deloge.

ELEMENTS OF STRENGTH.

The strength of a beam consists of four elementary principles of resistance to applied distorting force.

1. The cohesive or tensile resistance of the structural fibres, granules or molecules of the materials of its lower half cross-section—i.e., on the convex side of the neutral plane of the bent beam.

2. The crushing resistance of its upper half cross-section against compression—i.e., on the concave side of the neutral plane.

3. The lateral adhesion or longitudinal shearing resistance of the fibres or structural granules amongst themselves, reinforcing the individual direct tensile and compressive longitudinal strength of Nos. 1 and 2 above, as presently explained.

4. The effective leverage distance in inches, etc., at which the film or laminae of the fibres or granules act in the depth of the cross-section of the beam. This leverage, if multiplied by Nos. 1, 2 and 3 in pounds, hundredweights, or tons, constitute the moment of transverse resistance of the cross-section of the beam. The result for any span is expressed in foot-pounds, inch-pounds, foot-tons, etc., according to the combination of the measurements of weight and leverage which represent the stress and strain concerned.

CLEANING STONE.

The problem of cleaning the sculptured part of large public and private buildings which blacken and discolor so rapidly in our great cities has been carefully investigated in Paris by M. de Liebhabet, who puts his experience on record in the *Annales des Ponts et Chaussées*. He began at a number of masonry docks along the Siene. The black coating which covers the stone completely after a few years of exposure is first covered with a caustic paste consisting of soda and lime, which are mixed until they have the consistency of molasses. A little chloride of lime or perchloride of iron may be added. This paste is allowed to remain on the stone for two or three hours, according to the character of the stone and the state of the atmosphere. When it is washed off the stone is still black, but the coating has now been reduced to a condition in which it can be attacked by acids which before it resisted. After this preliminary operation a workman applies a mixture of sulphuric and hydrochloric acids, which is allowed to act for two or three hours. The mixture of the two acids varies slightly, according to the character of the rock and the inclination of its surface. Another set of men then wash the stone off with a jet of water. The process in Paris costs one-half of what is paid for scraping.

PILES FOR FOUNDATIONS.

Sand, if coarse in quality, dry, and sharp or angular in the form of its particles, is frequently found to afford a tolerably good base for foundations; not so good as gravel of variable structure, it must be admitted, yet sufficiently firm, if well supported by the surrounding material, to receive ordinary foundations. It will, however, be improved by a little lime fronting, and will require all possible precaution in preserving it from the insidious action of water percolating through it from springs or upper drainage. When, however, sand occurs in a shifting condition, constantly sliding away from the inclination of its bed, or from want of cohesion, or when it assumes the form of a quicksand falling in through wide fissures, and drifting into heaps, filling up holes in the subsoil, and undermining the surrounding materials by gradual insinuation among them, complete preparations become requisite, in order to prepare for the building of the foundations. In these cases the access of water and drifting sand must be intercepted, which may be effected by the use of concrete, aided by draining off the water from the upper strata. Or a row of sheet piles may be driven about the intended site for foundations, the interstices caulked—that is, filled up with oakum driven in with a tool—and the surface afterwards well coated with pitch. If the existing bed of sand be of small depth, it may be found worth while to remove it altogether over the surface required for the foundations, clear out the trench completely, level the surface of the sub-materials, if good, shore up the side of the trench with rough 3 in. planking, well pitched, and fill in with concrete or rough masonry.

If, however, the sand be of great depth and extent, piling will become necessary. Piles thus employed to secure a firm support for buildings effect this purpose in one of two ways, either by passing through the loose material, as sand, etc., and reaching a solid substratum of chalk, etc., into which they are driven so as to secure a firm footing or position, or by penetrating the loose material to such an extent that the friction between the sides of the piles and the surrounding materials sufficient to preserve them in their places and prevent future subsidence. This latter condition is evidently compatible only with stationary sand. If they have any disposition to shift, it becomes indispensable that the piling reach an independent footing in the firm material beneath, and thus afford a foundation free from the action of the sand through which it passes. Even with such piling as this it may be advisable to protect it with a row of sheet piling driven on that side from which the sand has a tendency to move, so as to protect the work from lateral pressure hereafter. The piles should be of Memel or Dantzic whole timber, from ten to fifteen square inches, care being taken that they are nice, straight-grown sticks, free from shakes, and in all respects sound and perfect. They must be properly shod with iron and pointed, and the top squared and properly fitted with wrought-iron rings

or collars to prevent splitting from driving. Their length will, of course, depend on the depth of the soil through which they are to be driven, or its tenacity. The monkey of the pile engine is usually from 8cwt. to 15cwt. in weight, and each pile should be driven until ten blows of this monkey will not force the pile down more than $\frac{1}{4}$ in. When all are thus driven to the proper depth, the tops of the piles are to be carefully squared to a uniform level throughout, and the upper timber work fitted. Longitudinal half timbers, 5in. to 7in. wide, and 10in. to 14in. deep, are first bolted to the piles, notched down upon the shoulders cut for them. These constitute the walings, and serve to bind the whole pile framing together. If the piles be sufficiently near to each other—say, not more than 2ft. from centre to centre—the longitudinal planking, which is rough, and 3in. or 4in. in thickness, may be spiked at once down on the surface formed by the piles and waling. If the piles are further, it will be necessary to fix transverse timbers, say 6in. by 6in., on the waling, in order to receive the planking which is to be spiked down upon them. The height to which the pile heads are first levelled will, of course, depend on the determination as to which of these methods is to be adopted.—Illustrated Carpenter and Builder.

POWERS OF A CORPORATION.

A case of much interest to municipal officers, as affecting the powers of a municipality, came up before the Courts at Osgoode Hall, Toronto, recently. A motion for an injunction was made by Wm. Horton, a citizen of Windsor, Ont., to prevent the water commissioners of that city from spending \$20,000 in erecting water filters. By statute the city is permitted to spend \$300,000 on water-works. Horton claims that the city will exceed this amount if permitted to spend money for filters, and he seeks by injunction to prevent them doing so. The water commissioners claim that in addition to \$300,000 they are entitled to spend the water rates of the city. This is the question at issue. Chief Justice Armour ruled that Windsor should be a party to the action, and adjourned the case for two weeks to permit this being done, an interim injunction being granted in the meantime.

BONDING OF MASONRY.

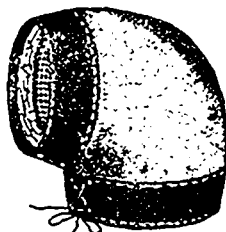
The careful bonding of masonry is a very important matter, and should receive the close attention of the workman. A wall built of the roughest stones ought to be perfectly stable, though no mortar is used.

The principles of bond, by the stones overlapping and breaking joint throughout the wall, are the same as in brickwork, and should be thoroughly understood by the mason, for upon their skilled application his reputation as a good waller depends.

Dry and porous stones should be well wetted before being laid in mortar, so as not to absorb the moisture required for the proper setting of the mortar. All joints in the wall should be filled up solid with mortar and spawls. The thickness of the bed-joints, depending on the smoothness of the beds, must be sufficient to prevent any unequal bearing resulting from actual contact between any irregularities on them.

When a good appearance is aimed at, all stones exposed to view should be selected free from stains, chiefly caused by the presence of oxides of iron. In cobble or field stone building, bowlders are often chosen that are variegated in color, in order to give an æsthetic effect to the work, but the proper disposition of these stones can only be directed by an artist, and this part should be considered if "cobble-work" is undertaken with a view of being artistic.—National Builder.

Brickwork constructed in cold weather, using ordinary mortar prepared with warm water, proves very satisfactory in point of resisting power; nor is any improvement effected by dissolving in water $\frac{1}{2}$ per cent. of calcium chloride. Excellent results are obtained when the mortar is produced with warm water containing in solution $1\frac{1}{4}$ per cent. of common salt. The addition of freshly slaked lime to ordinary mortar results in a satisfactory degree of durability; but still better results are obtained by the exclusive use of freshly slaked lime, especially when employed in conjunction with calcium chloride. An admixture of Portland cement with common mortar increases its resisting power to frost.—Thon Industrie Zeitung.



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CONCRETE IN COLD WEATHER.

The pressure of building operations has necessitated many modes of doing work during severe winter weather. One instance of this is the use of concrete and mortar in foundations. The details of some concrete work executed at Helsingfors, Finland, which were recorded in the Engineering Record are of some interest in this connection. The concrete work consisted of the foundations of a warehouse and two bridge piers, and was performed in the winter of last year. There was an urgent wish to complete the work for the brief summer season, and the operations were carried on through the winter, although the temperature ranged below 14° above and 40° below zero. The foundations, which were necessary to protect, rested partly on stone cribwork of an old quay and partly on piling, concrete being used to distribute the pressure. The depth of concrete was 31 in. and the breadth 46 in. As this was commenced when the temperature was 4° below Fahr. great care was required in the preparation and protection of the concrete. "For this purpose," says our contemporary, "a movable house heated by two coke stoves was mounted on wheels over the trench. It was 26 ft. long and 20 ft. wide, and was mounted on six four wheel trucks. In this house, during the mixing of the concrete, the temperature was kept at about 54° F. The stone and sand were brought into the house in large quantities, and warmed before using. When mixed, the concrete was placed in the trench through three trap doors in the floor of the house. To keep the outer air from the trench, the walls of the house were continued down to the ground by movable weather shields, whose edges were packed with coarse matting and wood-shavings." Means were taken to

thaw the ice of the ground water in the trenches by the use of steam boilers mounted on wheels, with steam pipes going down to the surface of trench. When the ground under the house and a little in advance of it, was thawed, a 12 in. layer of broken stone was packed in. The concrete was mixed by hand, with the water warmed to between 158° and 176° Fahr., and to protect the concrete until set against frost from sides of trench, sheet piling, with a filling of broken stone, was used. The bed was then covered with a double layer of straw matting, and the trench space covered with planks, matting and trodden snow. After the house was moved on, the space left was warmed by a kettle filled with burning coke. This kept the temperature of the air about 54°, and the setting of the concrete was thus assured. The details are illustrated in the Record, to which we refer our readers. The system is ingen-

ious and practical, and would enable concrete to be laid during the severest weather.

The Chatham Dredging Co., of Chatham, Ont., have completed what is believed to be the largest drainage ditch in America. It is known as the Raleigh Plains ditch, is over ten miles in length, 90 feet wide at the outlet, and tapering to 45 feet, and 9 feet deep. The contract price was in the neighborhood of \$40,000. This huge drain, which empties into Jeannette's Creek, a tributary of the Thames river, serves the townships of Raleigh, Harwich and Tilbury, removing surplus water, which at certain seasons of the year submerged the low-lying farm lands, doing wide-spread and heavy damage. The work of construction has occupied two years. Through litigation, which involved an appeal to the Privy Council, the work has been delayed for years, and the township of Raleigh saddled with law costs aggregating \$25,000.

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MUNICIPAL DEPARTMENT

MUNICIPAL ACCOUNTS AND AUDITS.*

(Concluded.)

REMEDIES.

An enumeration of the causes has to some extent suggested the needed remedies.

I have but little hope of improvement in the matter of the appointment of treasurers. So far as I can judge the operation of the municipal mind, the appointments will be made upon the same old lines, for many a year to come. But I do think that it should be made an absolute requirement that the treasurer when appointed either understands the principles of bookkeeping to a fair degree, or be called upon to acquire them without delay.

A most valuable aid in this as well as an important adjunct to the audit would be a handbook for treasurers and auditors covering all their duties, with complete instructions as to methods of carrying them out, and comprising a set of municipal accounts introducing and recording all the transactions which arise in municipalities. The need for such a work has impressed itself upon me so frequently that I have gathered together nearly all the necessary material and hope soon to produce a pioneer effect in that direction.

Instead of leaving the ledger and the system of accounts and the form of the Auditor's report to the choice of the council, which practically means to the treasurer, I think that the statutes should provide not only for a ledger, but also for a uniform system of accounts and reports in unison with the reports required by the Bureau of Industries. This system should include a well-digested revenue account, and also such a form of debenture register as would be sure to preserve a complete and concise record of all debentures and coupons issued by the municipality. The ledger balances should be regularly reported to the council in comparison with the yearly estimates, that they may be guided in their expenditure.

All moneys received should be deposited in a bank instead of any part being used to pay orders upon the treasurer; and the collector of taxes instead of handing the money to the treasurer should invariably deposit the amounts collected by him in the bank to the credit of the treasurer—taking the bank's receipt in a duplicate deposit book. All payments should then be made by cheque, and I would add the further safeguard of having the head of the council countersign the cheques. All the money could then be traced with certainty, the condition of the cash at any

date could be readily ascertained, and the funds would be under the protection of double custody. Under such circumstances the amount of surety bonds can be safely lessened, and it will be found to reduce the premium rates of the guarantee companies.

My chief hope for improvement lies in the audit. In order to improve its efficiency I believe it to be necessary to make a radical change on the lines of the change made by the Education Department in 1871, when local or township superintendents of schools gave place to county inspectors.

My proposal would be that a chartered accountant or other properly qualified auditor should be appointed to audit and report for all the municipalities in a county, or as large a district as he can properly serve. He might perhaps be in charge of all bodies handling public moneys, including schools.

The method of his appointment is partly a question of patronage, which I am not competent to deal with, but as he must audit the operations of the County Council, perhaps he ought to be appointed by the province and paid by the county. He should be independent of all those whose operations he must report upon. He would inspect and report upon the work of all officers and the council according to a uniform system of audits and reports, and should have power, when necessary, to compel compliance with moderate requirements. His reports should be made to the Provincial Superintendent of Municipal Audits.

The auditors should be under the supervision of a provincial superintendent, whose duty it would be to regulate the form and system of accounts and bookkeeping to be used in all the municipalities, as well as the method of conducting the audits and the form of the reports.

He would also receive and check the reports of all the auditors, and when any of such reports are unsatisfactory, or when the condition of affairs in any municipality seems to require it, it would be his duty to investigate with the usual powers of a royal commission.

I believe that by these means a much more efficient audit would be secured and it would greatly tend to improve the safety and management of the public funds. Taking such efficiency into consideration, this proposed system would eventually be found to be even more economical than the present one, for the amount of auditor's fees now paid in all the municipalities in a county would constitute a very respectable salary for the county auditor. His appointment would be permanent and he would become thoroughly familiar with the affairs of all the municipalities under his charge, and should thus be quick to detect anything that required his special attention.

THE SEWAGE FARM IN PARIS.

For more than a quarter of a century the city of Paris has been using its sewage for irrigation. The fact that in the light of this long experiment it has

recently more than doubled the area under irrigation shows that the process is considered a practical success. The sewage of Paris consists mostly of the water used for washing the streets. As water-closets are to a large extent connected with vaults, the sewerage is not so highly polluted nor so rich in fertilizing materials as might be supposed. The fields irrigated contain 799 hectares (about 1,970 acres). The city of Paris expended 200,000,000 francs (about \$40,000,000) in acquiring the land and constructing the aqueduct, pumping machinery, and irrigating canals. The crops grown are vegetables and fruits—largely small fruits. The methods of irrigation are exactly those practised in the arid regions of the United States. The gardens, though only two years old, presents a scene of almost tropical exuberance. Many dwarf fruit trees are already in bearing. Fortunately, the soil is of a sandy nature, permitting somewhat rapid filtration. At the end of the field, next to the river, the sewage which has passed through the soil re-appears as a large stream of pure water, colorless and bright. The number of micro-organisms, which is many millions in the sewage, is diminished to 2,500 per cubic centimeter of the sewage water.

LEGAL DECISIONS AFFECTING MUNICIPALITIES.

ELLIS V. TOWN OF TORONTO JUNCTION.—The plaintiff was appointed police magistrate for the town of Toronto Junction by commission of the Lieutenant-Governor, expressed to be without salary, in 1892, the town council having previously, in 1890, requested that a police magistrate should be appointed. In 1890 the population was under 5,000; but in 1892, when the appointment was made, it was over 5,000; and on the plaintiff demanding \$800 per annum as salary, asserting that it was his due under the statute respecting police magistrates, the town council at first paid him this salary. In 1894, having first tried in vain to get the plaintiff to resign, the town council resolved to pay him only \$400 a year, which the plaintiff agreed to accept. In 1895 the town council resolved to discontinue the plaintiff's salary altogether. Chancellor Boyd decided that the plaintiff not having been appointed as a salaried official, had no right to a salary as one of the incidents of his office, and the Police Magistrate's Act did not apply, and the town council were entitled to act as they had done.

VANCOUVER WATERWORKS.

The city of Vancouver, B. C., furnishes an argument in favor of civic ownership of waterworks. Less than five years ago the city purchased the waterworks system from a private company, and during that period have not only largely reduced the rates, but have had a good surplus each year. The water committee decided to make a further reduction to take effect at the first of the year, and the rates are now 50 per cent. less than those charged when the company owned the works. Two years ago an offer was made the city for the purchase of waterworks which would pay off all indebtedness on the bonds, but the council refused to accept the offer.

* A paper read before the Chartered Accountants of Ontario, Tuesday, 15th December, 1896, by Arthur C. Neff, C. A., Toronto.

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CONDITION OF THE MARKET.

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MONTREAL: There has been a fair inquiry for light goods, but little business seems to have resulted. The influence of the holiday season has been felt in every line, and as travellers are off the road, few sales are reported. For a few weeks trade will be quiet, until the approach of spring shall revive the demand.

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