

recommended the construction of the following works, permanent pavement on Laval avenue St. Louis square and parts of Ontario and St. Catharines streets, estimated cost \$60,000; asphalt pavement on Pouscouros market; drain on Notre Dame street, from Papineau square to the cotton factory.—The Government will be asked to provide a new morgue built in an isolated place and fitted up with all modern appliances.—It is stated that Mr. Bickerdike, who succeeded in getting an Act of Incorporation empowering him to build electric railways in St. Henri and St. Cuneonde, will commence the construction of the roads early in the spring. It is also proposed to build a suburban line to Lachine and St. Anne's.—The City Surveyor will receive tenders until Wednesday, the 28th inst., for the construction of a sewer on Notre Dame street, from Lacroix to Monarque street.—Perrault & Lesage, architects, are preparing plans for a three story building on McGill street, for B. Colmbier, also for a three story dwelling on Notre Dame street east for Jas. Deschatelets.—L. R. Montbriant, architect, is preparing plans for a residence at Long Pointe.—J. R. Gardner architect, is preparing plans for six cottages to be erected at Beaconsfield.

HAMILTON, ONT.—The Council has decided to construct a sewer on Emerald street, south of Stinson street, and a six-inch water main on Wood street.—Plans will shortly be prepared for new buildings for the Hamilton Exhibition Association. The City Council will be asked for a grant of \$50,000 towards their erection.—Messrs John Eustice and Adam Cook are said to have purchased land for a park at the top of the mountain, with the intention of erecting thereon a hotel, plans for which have been prepared.—A building permit has been granted to John Doherty for two two-story brick houses on Burlington street, between John and Hughson streets, to cost \$1,400.—Messrs. C. M. Counsell, Adam Zimmerman, J. H. Tilden, W. J. Copp, W. A. Wood, John Patterson and Thomas Patterson, of this city, and N. Dymont, of Barrie, are applying for incorporation as the Hamilton Radial Electric Railway Company, the object being to construct and operate an electric railway from this city to the following points: To the town of Mount Forest, running through the village of Waterdown and city of Guelph and the towns of Fergus and Arthur; to the town of Oakville, via Hamilton Beach and the villages of Burlington and Bronte; to the city of Brantford, running through the unincorporated village of Ancaster; to the town of Dunnville, Haldimand, or Welland, running through the village of Smithville.—The Board of Works have decided to arrange a conference with the G. T. R. authorities to secure the erection of a street bridge on Barton street.—In view of the heavy tolls collected by the owners of the several municipal road running into Hamilton, it is suggested that the city shall build a series of electric street railways to connect the city with the suburban districts.

TORONTO, ONT.—Mr. Arthur Burke, barrister, Freehold Loan Building, contemplates erecting a dwelling adjoining his residence on Gerrard street east, near Parliament street.—Mr. Wm Osgooby, with some of his friends, is said to contemplate the erection of a number of cottages in Muskoka.—Tenders are wanted for building three houses on Mutual street. Particulars at office of T. E. Washington, 28½ Victoria street.—Excavating has been commenced for a dwelling to be erected on the south side of Grosvenor street, immediately east of Surrey Place.—The City Engineer has recommended the construction of a sewer on Wallace avenue, to cost \$2,560, and the repairing of Brock street sewer, from Front street to its outlet, at a cost of \$10,000.—The Municipal Council of North Toronto has given notice of its intention to lay a six inch water main, with necessary hydrants, connections, etc., on Glencairn avenue, from Yongestreet to within seventy feet of the easterly limit of Chancellor st.—Petitions have been presented to Council for the construction of water mains on the following streets: Chatham street, 2,000 feet, cost \$3,000, Woodbine avenue, cost \$1,200; Dundas avenue, cost \$800; Macpherson ave., cost \$300.—Follows is the estimated cost of the proposed extensions of sewers into the bay: Berkeley street sewer to windmill line, \$3,400; Sherbourne street sewer to

end of Polson's dock, \$5,900; Church street sewer to end of present dock, \$8,300; Yonge street sewer to windmill line, \$13,000; Jarvis street sewer to end of dock, \$5,200; Brock street sewer to end of present dock, \$4,600.—At a meeting of the Board of Works held on Wednesday last, it was decided to proceed with the construction of the following pavements Avenue road, between Bloor street and northern city limits, cedar blocks with granite toothing, cost \$22,000; Gerrard street, from River to Parliament street, cedar on concrete, with granite or scoria toothing, cost \$9,800; Parliament st., from Gerrard to Carlton st., asphalt with granite or scoria toothing, cost \$5,900; Carlton st., from Parliament to Yonge st., asphalt with granite or scoria toothing, cost \$27,050; College st., from Yonge to Rathurst st., asphalt with granite or scoria toothing, cost \$44,100; College st., from Rathurst st. to Jameson ave., cedar on concrete, with granite or scoria toothing, cost \$39,340; Jameson ave., from College to Dundas st., cedar on concrete, with granite or scoria toothing, cost \$1,584; Queen st., from Yonge to Parliament st., asphalt with granite or scoria toothing, cost \$26,750; Queen street, from Parliament to River st., cedar on concrete, with granite or scoria toothing, cost \$9,800; Dundas st., from Queen to Arthur st., asphalt with granite or scoria toothing, cost \$12,700; Dundas street, from Arthur st. to the Dundas street bridges, cedar on concrete, with granite or scoria toothing, cost \$26,200; York st., from Front to King st., asphalt with scoria or granite toothing, cost \$7,830; George street, from Front to King st., granite block on concrete, cost \$2,370; Frederick st., from Front to King st., granite block on concrete, \$2,370; Front st., from Frederick to Sherbourne st., granite block on concrete, cost \$2,540; Sherbourne st., from King to Front st., granite block on concrete, cost \$2,370. In addition to the above pavements the City Engineer presented the following list of streets which require to be paved from kerb to kerb: Winchester street, from Parliament street to Ontario street; Prospect street, from Rose avenue to Parliament st.; Amelia st., Sumach to Parliament st.; D'Arcy st., Beverley to McCaul st.; Baldwin st., Beverley st. to Spadina avenue; Cecil st., Beverley st. to Spadina ave.; Henry st., Baldwin to Cecil st.; Bellevue st., College st. to Bellevue pl.; Orde st., 120 feet east of McCaul st. to east end, St. Patrick st., McCaul st. to Spadina Ave.; Sullivan st., Beverley st. to Spadina ave.; Grove ave., Dundas to Foxley st.; Northcote ave., Queen st. to Sunn ave.; Rolyat st., Dundas st. to Grove ave.; Lisgar st., Queen st. to Dundas st.; Argyle st., Dundas st. to Gladstone ave.; Saurin ave., Northcote ave. to Lisgar st.; Nassau st., Spadina ave. to Lippincott st.; Earl st.; Booth ave.; Melville ave., and lane in rear of Canada Permanent building.—The City Council have approved of the action of the architect, Mr. E. J. Lennox, in taking possession of the works in connection with the new Court house, and tenders will be invited for the completion of the entire work. The architect is desirous of having the masonry completed this fall, tenders for which will be asked immediately.—The following building permits have been granted: S. R. Warren & Son, 39 McMurrich st., r. c. add, to factory, cost \$1,000; G. F. Price, 172 Dalhousie st., new shop fronts and bk. foundations to stores, 232 and 234 Queen street w., cost \$1,200; John Maloney, mansard roof to Imperial hotel, cor. Jarvis st. and Commercial lane, cost \$1,000; Thos. Murray, 1524 Queen st. w., 3 story bk. store and dwelling, n. e. cor. Queen st. and Macdonnell ave., cost \$3,500; W. H. Pratt, 198 Jarvis st., det. 2 story and attic bk. residence s. w. cor. Bloor and St. George sts., cost \$9,000; T. Douglas, 4 story bk. warehouse, 122 Adelaide st. w., cost \$10,000; W. J. Bromley, det. 2 story and attic bk. dwelling, Bedford rd., first lot south of Bernard ave. Mrs. Baldwin, is about to erect a detached residence on the corner of Avenue road and Health street.—A new chapel is to be erected in connection with Mount Pleasant cemetery, also a new vault and conservatory.—Mr. John Ayre, of the Lakeview Hotel, contemplates the erection of a residence at Island Park.

FIRES.

The woollen mills of Messrs. Roben & Fils at Beauharnois, Que., were entirely destroyed by

fire on Thursday of last week.—E. S. Edmonson & Co's. flour mill at Oshawa, Ont., was burned to the ground on Tuesday last. The electric light plant situated in the building was destroyed.—The residence of Mrs. J. Hogg, at Wingham, Ont., was burned recently. Insurance \$1,000.—The paint shops of the Canadian Pacific Railway Company at Toronto Junction, were destroyed by fire on Tuesday last. The loss on the building is estimated at \$4,000.—Slaughenwhite Bros.' mill at the head of St. Margarets Bay, N. S., was totally destroyed by fire last week. The loss is estimated at \$5,000.—The Richelieu and Ontario Navigation Co's. steamer Corinthian, was totally destroyed by fire in Cedar Rapids a few days ago. Insurance, \$40,000.—St. Andrew's Roman Catholic church at Port Arthur, was damaged by fire on Thursday last, to the extent of \$3,500.—About thirty dwellings and fifteen places of business were destroyed by fire at Bucouche, N. B., on the 22nd inst. The loss is estimated at from \$60,000 to \$90,000.

CONTRACTS AWARDED.

TORONTO, ONT.—Mr. Benjamin Kerr has secured the contract for enlarging the Island Park pavilion, at the price of \$1,684.

LONDON, ONT.—Mr. W. Walterworth, of Ingersoll, has secured the contract for the erection of the new C. P. R. station in this city.

OTTAWA, ONT.—The Government has awarded the contract for sections 1 and 2 of the Soulanges Canal to Mr. A. Stewart, of this city, the works to be constructed of concrete.

TORONTO JUNCTION, ONT.—The Hamilton Bidge Company have secured the contract for the construction of the overhead foot bridge on McMurray avenue, their tender being \$4,976.

KINGSTON, ONT.—Tenders for Judge Price's house have been awarded as follows: carpentry, E. M. Storey, masonry, H. Sleeman; painting, Robinson Bros.; plumbing, Jameson & Son; tin-smithing, Nugent & Taylor.

HAMILTON, ONT.—The City Council has awarded contracts as follows for the construction of sewers: Chatham street, John Harris, 79 cents per lineal foot; Ferguson avenue, from Barton to Robert streets, J. C. Kent, 94 cents per foot.

BRANTFORD, ONT.—The contract for the new bridge across the river for the Toronto, Hamilton and Buffalo Railway has been awarded to the Dominion Bridge Company, of Montreal.—The Royal Electric Co., of Montreal, have purchased from the Waterous Engine Co., of this place, one of their clutch pulleys, 93 x 52 feet, for street railway purposes.

GUELPH, ONT.—The Guelph Silica Barytic Stone Company have been awarded the contract for the construction of permanent sidewalks on a number of streets.—Mr. C. M. Reynolds has awarded the contract to Mr. Chubb and Mr. Wideman for the erection of a two story double brick residence on the corner of Dublin and Paisley streets.

WINNIPEG, MAN.—Mr. J. A. McDermid of this city has been awarded the contract for the erection of the new barracks at Fort Osborne, the price being \$28,000. The contract for stone work has been sub let to Messrs. Shaw & Co.—The contract for repairs to Jas. Robertson & Co's. warehouse has been let to Messrs. Laird & Hazel, at the contract price of \$3,800. Mr. C. H. Wheeler has charge of the work.

MONTREAL, QUE.—A. C. Hutchison, architect, has awarded contracts as follows for a three story building on Bleury street for H. Lyman, masonry, J. B. St. Louis; carpentry, L. Piton & Son; roofing, Campbell & Co.; plastering, L. Phillips; brick work, A. McArthur; plumbing, Hughes & Stephenson.—J. R. Gardner, architect, has awarded the contract for a cottage at Lachine, for W. Kavanaugh, to D. Legault, Montreal; also two cottages, for C. P. Salter, and W. G. Slack, to H. Brunet, of St. Anns.—Perrault & Lesage, architects, have awarded contracts as follows, for a three story residence for R. Prefontaine: masonry, Plant & Dubuc, brick work, Jos. Brunet & Son, carpentry, plastering, roofing and plumbing, Bourgoin & Cadieux.—L. R. Montbriant, architect, has awarded contracts for a residence for B. Lefebvre, on Ontario st., as follows: masonry, P. Lecompte; brickwork, plastering and painting, A. Racette; roofing and plumbing, Geo. Von, carpentry, E. Gauthier.

MUNICIPAL DEPARTMENT.

FOUNDATIONS FOR BRIDGES.*

By P. MOGRSEN.

(Continued from last week.)

When the wells have been sunk to the required depth, they should be filled with cement concrete up to ground level, where neat work may conveniently be commenced. Small arches should be built to support the body of the pier where it overhangs the openings caused by the curvatures of the wells.

Instead of brick wells iron cylinders are advantageously employed where they can be procured at a relatively low price, and especially where a large diameter is required, and in this case the brick wells are liable to collapse. The iron cylinder has the further advantage of presenting a smaller annulus to be cleared at the bottom, and having a smoother outside surface its own weight is often sufficient to force it through the ground. The methods of sinking iron cylinders and masonry wells are essentially the same.

Where the river bed consists of layers of sand and rough gravel mixed, with or without a certain amount of smaller and larger stones interspersed, it will be found cheapest and quickest to make an open excavation without lining or shoring of any kind except in the pump-well. This can be done by giving the sides a slope of one half or three-quarters to one. The excavated material can be taken out either with a crane or with wheelbarrows, and should be placed in such a position as to offer additional security against and breakage in dams, floods caused by heavy rains, or other natural agencies.

The pump-well should be made in one corner of the excavation, and for a hump of from five to ten inches bore a well with an area of twenty to twenty-five feet is required. This can be sunk advantageously by placing planks about six feet long on end and outside of two wooden frames, one about a foot from the bottom end and the other close to the top.

As excavation inside this lining proceeds, the suction tube should be lowered, and whenever the lower end of a plank has been left free by picking out the obstructing material, it should at once be driven down as far as possible. By giving the part of the well above the lining a slope of about one-half to only one length of planks will be required, and this method will be found the cheaper and more convenient than lining the well throughout the whole depth. The well should be continually at least two feet lower than the excavation so that this may be the better drained.

Many engineers, when not directly interested in the cost of the work, disapprove of the idea of making an open excavation in water-bearing ground without lining, and generally suggest some more complicated method. It is true that the open excavation requires of the constructing engineer his personal supervision of details, which means hard work; but it is also true that, when at all practicable, this is by far the cheapest way of doing the work.

Under circumstances such as those described it is customary to place the brick or stone masonry on a concrete foundation of from one to two inches in thickness, and with an offset of nine or twelve inches on all sides. When, therefore, the excavation is down to its proper depth and the bottom has been made as nearly as possible the exact size of the concrete foundation, the latter can be made very satisfactory by letting concrete, mixed in the ordinary way, down a chute to the bottom of the excavation. To prevent the inflowing water from washing the cement of the concrete into the pump-well, the water should be allowed to rise to a convenient height so as to become calm with no applicable current towards the well. When good Portland cement or its equivalent is used and the earth acts as a casing, it will be quite safe to commence building on the top of the concrete foundation twelve to eighteen hours after it has been made.

Before any masonry is started the work should be carefully marked off. If the pier has a base with one or more offsets, as is usually the case, no great accuracy is necessary until the level of neat work is reached, but if at any stage of the

*Read before the Civil Engineers' Club of University of Illinois.