

CANADIAN Contract Record

*A Weekly Journal of Public Works, Tenders,
Advance Information and Municipal Progress*

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. 17.

TORONTO, MONTREAL — SEPTEMBER 19, 1906 — WINNIPEG, VANCOUVER

No. 29

THE CANADIAN CONTRACT RECORD

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In Contractor's office. Advertiser has had a number of years' experience, more particularly on the commercial side of the building. C. F. MYERS, 935 Bathurst Street, Toronto.

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We offer for immediate shipment from stock, and subject to prior sale: 10,000 ft. 8 & F Cast Iron Pipe "MacLarens," 8" x 45 x 12' 0". Proved to 300 and coated.

L. H. GAUDRY & CO.,
Quebec.

SEALED TENDERS

addressed to D. Doyle, Town Clerk, Hawkesbury, Ont., and endorsed "Tenders for the construction of Macadamized Roadway," will be received until 12 o'clock noon on MONDAY, THE 17TH DAY OF SEPTEMBER, 1906, for the construction of Macadamized Roadway on Main street west, town of Hawkesbury.

Plans and specifications of the proposed work can be seen, and forms of tender obtained at the office of the undersigned.

The lowest or any tender not necessarily accepted.

D. DOYLE,
Hawkesbury, Sept. 17, 1906. Town Clerk.

TENDERS FOR HIGHWAY BRIDGE

Sealed tenders will be received by the undersigned up to SEPTEMBER 21ST for the construction of a 50 foot reinforced Concrete Arch Bridge in the Town of Oshawa, according to plans prepared by Connor, Clarke & Monds, consulting engineers, Toronto.

Plans and specifications may be seen at the office of the undersigned or of the engineers at 36 Toronto Street, Toronto.

W. S. BOWDEN, Town Engineer,
Oshawa, Ont.

Town North Toronto

Sealed tenders will be received by the undersigned marked "Tenders for Sidewalks" up to 7 o'clock p.m. on WEDNESDAY, 3RD OCTOBER, 1906, for building a Concrete Sidewalk 5 feet in width, on the east side of Yonge street from about the north side of Eglinton avenue southerly to the south limit of the town, except a part to the south of Glenwood avenue, where the present plank walk is on trestles. Also for a Concrete Sidewalk on both sides of Brakline avenue 4 feet in width part way. Also for a Vitriified Brick Sidewalk 4 feet in width on Gleggrove avenue from Yonge street westerly to the west side of lot 128, between the south row of double pines.

Plans and specifications can be examined at the Town Hall and specially from 4 to 6 o'clock p.m. on Thursday, 27th September, 1906, when the town engineer will be present to give explanations as to same.

Tenders to be at a rate per lineal foot of 5 feet on 4 feet in width for the concrete walk and at a rate per lineal foot for vitriified brick walk 4 feet in width, in all cases to include lanes, private entrances, road crossings, etc., as per plans and specifications.

A marked cheque for \$5 to accompany each tender, to be payable to the undersigned, which is to be returned when the successful tenderer enters into contract with the town.

The lowest or any tender not necessarily accepted.

W. J. DOUGLAS, Clerk and Treasurer,
Eglinton P.O., 17th September, 1906.



TEMISKAMING AND NORTHERN ONTARIO RAILWAY COMMISSION.

TENDERS FOR GRADING

Sealed tenders, addressed to the undersigned and marked respectively "Tender for Kerr Lake Branch," "Tender for Charlton Branch" and "Tender for Haileybury Spur," will be received up to 12 o'clock noon, on TUESDAY, OCTOBER 2ND, 1906, for all the work except tracklaying and ballasting connected with the building of the following branch lines, viz.:

1. From the main line near Cobalt to the Kerr Lake region, a distance of approximately four miles.
2. From the main line to a point at or near Haileybury Wharf, a distance of about one and three-quarter miles.
3. From the main line near Englehart to the village of Charlton, a distance of about eight miles.

Plans and specifications may be seen at the office of the Commission, 25 Toronto Street, Toronto, and at the Chief Engineer, North Bay, Ontario.

Marked cheques payable to the order of the Chairman and Secretary-Treasurer of the Commission must accompany tenders as follows: Kerr Lake Branch, \$2,000.00; Haileybury Spur, \$500.00; and Charlton Branch, \$3,000.00.

Tenders must be made out on the printed form supplied by the Commission.

The Commission will not be bound to accept the lowest or any tender.

H. W. PHARSON,
Secretary-Treasurer,
25 Toronto St., Toronto.

Dated at Toronto, September 10th, 1906.
Papers inserting this advertisement without authority will not be paid for same.

TOWN OF DALHOUSIE

Province of New Brunswick

TENDERS FOR WATERWORKS

Sealed tenders addressed to the Town Clerk of the Town of Dalhousie, New Brunswick, will be received until 7.30 p.m.

Wednesday, October 3rd, 1906,

for laying about 17,000 feet of conduit pipe, part 12-inch, part 10-inch, and part 8-inch diameter, and for furnishing all materials therefor.

Plans and specifications will be ready for inspection, and may be seen at the office of the Chief Engineer, 103 Bay street, Toronto, or at the office of the Town Clerk, Dalhousie, N. B., on and after September 24th.

No tender necessarily accepted.
Tenders for other sections of the work will be called for at a later date.

WM. S. MONTGOMERY, Esq.,
Mayor, Dalhousie, N. B.

ALEX. J. LE BLANC, Esq.,
Town Clerk, Dalhousie, N. B.

W. E. DOUGLAS,
Resident Engineer, Dalhousie, N. B.

WILLIS CHIPMAN,
Chief Engineer, 103 Bay St., Toronto.

Toronto Public Reference Library

Tenders for Building

Sealed tenders, endorsed on envelope, "Tender for the Public Reference Library Building, Toronto," and addressed to C. Egerton Ryerson, Esq., Secretary-Treasurer of the Toronto Public Library Board, corner Church and Adelaide streets, Toronto, will be received until noon on OCTOBER 10TH for work and materials required in the erection of the Toronto Public Reference Library building for the board of the Toronto Public Library. Tenders may be lump or separate, the works proposed including the following: Excavation, masonry and brick work, reinforced concrete and paving, terra cotta, carpentry, painting and glazing, plastering, footing and sheet metal work, steel, electric wiring, stacks, plumbing and heating, elevators. Plans and specifications may be seen and forms of tender obtained at the office of the architects, Wickson & Gregg, and A. H. Chapman, 59 Yonge street, Toronto. Each tender must be accompanied by a marked cheque, payable to the order of the Toronto Public Library Board, equal to 2 1/2 per cent. of the amount of the tender, which will be subject to forfeiture in case of failure on the part of the contractor to enter into a written contract with approved sureties if called upon to do so. The board reserves the right to reject any or all tenders or to accept any tender that appears advantageous to the board.

C. EGERTON RYERSON,
Sec. Treas. Toronto Public Library Board,
corner Church and Adelaide streets.
Toronto, September 14, 1906.

[FOR ADDITIONAL ADVERTISEMENTS FOR TENDERS SEE NEXT PAGE.]

TENDERS

will be received for the different trades required in the erection of a

CONCRETE FACTORY BUILDING

near the Don for the Carriage Mountings Company.

Plans at office of John S. Fielding, Consulting Engineer, 15 Toronto street. Tenders to be in by SEPTEMBER 20TH, 1906.
Tenders at same time for Air Compressor, Pneumatic Tools and Appliances.

TOWN OF DUNNVILLE
PROVINCE OF ONTARIOWATER WORKS
EXTENSIONS

Sealed tenders will be received by the town clerk until 8 p.m.

TUESDAY, OCTOBER 2ND, 1906

for laying about 7,000 lineal feet of water mains also for furnishing all materials therefor.

Plans, specifications, etc., may be seen at the office of the Chief Engineer, 103 Bay street, Toronto, and at the Town Clerk's office, Dunnville, on and after September 20th.
No tender necessarily accepted.

WILLIS CHIPMAN, Chief Engineer,
103 Bay Street,
Toronto, Ont.
J. W. HOLMES, Esq.,
Town Clerk,
Dunnville, Ont.

CONTRACTS OPEN.

HOMER, B.C.—The C.P.R. intend erecting a saw mill here.

ARCOLA, SASK.—The erection of a new brick flour mill is being considered.

CARGILL, ONT.—Dr. C. C. Tatham is having plans prepared for a new residence and office.

HALIFAX, N.S.—It is proposed to establish a car manufacturing plant here. H. McInnes is interested.

CHATHAM, ONT.—Philadelphia capitalists are considering the establishment of an oil refinery here.

GLACE BAY, N. S.—M. F. McNeil has this week taken tenders for erection of a Central school building.

YORKTON, SASK.—A by-law is to be voted on to spend \$90,000 on sewers, waterworks and telephones.

SANDWICH, ONT.—G. E. Smeaton, town clerk, is offering \$6,000 4½ per cent. town debentures for sale.

WESTPORT, ONT.—W. McKnight will receive tenders up to October 20th for purchase of \$1,751.85 debentures.

MOOSE JAW, SASK.—On September 28th a by-law will be voted on to raise \$19,000 for the erection of a fire hall.

LETHBRIDGE, ALTA.—The Columbia Milling Co., Enderby, B. C., are considering the erection of a flour mill here.

MONCTON, N. B.—It is understood that John Townes will erect a two-story brick building corner Church and Main streets.

ESTEVAN, SASK.—The C.P.R. are planning to build additional freight sheds and make other improvements here, cost \$30,000.

MEAFORD, ONT.—G. G. Albery, Town Clerk, has this week taken tenders for construction of sewer works, etc., in the town.

KENORA, ONT.—The Board of Education have decided to erect a High school building on the site of the North Ward school.

CROWLAND, ONT.—It is understood that forty dwellings will be built here for employes of the Ontario Iron & Steel Co.

KAMLOOPS, B. C.—J. J. Carman, city clerk, will receive tenders up to September 25th for supply of sewer pipe and connections.

HAWKSVILLE, ONT.—Thos. Wilkinson will receive tenders up to September 20th for purchase of \$1,500 five per cent. debentures.

NANAIMO, B. C.—A. R. Johnson is one of the promoters of a scheme to establish a large cold storage plant here, cost about \$50,000.

PORT ARTHUR, ONT.—The C. P. R. purpose building a larger station here than was first proposed and have cancelled the old plans.

DIGBY, N. S.—The British American Oil & Fertilizer Co., of Cleveland, Ohio, have secured a site at Joggin Bridge for establishment of a plant.

WIARTON, ONT.—W. J. Ferguson, Town Clerk, will receive tenders up to October 1st for purchase of \$13,759.04 4½ per cent. debentures.

PORT MOODY, B. C.—John McLean has purchased a site on the waterfront where he proposes erecting a new shingle mill to cost about \$10,000.

BOISSEvain, MAN.—C. Goddard, Winnipeg, has submitted a report to the Town Council on the proposed waterworks and sewerage systems.

BROCKVILLE, ONT.—B. Dillon, architect, is calling for tenders for additions to building on King street to be occupied by A. T. Wilgress.

NIAGARA FALLS, ONT.—The by-law has been carried in Stamford township to grant privileges to the Ramapoison Works to locate there.

GODERICH, ONT.—The G. T. R. have decided to remodel the terminal here. Larger freight sheds will be built and other improvements made.

MARKHAM, ONT.—The Town Council have decided to have a by-law prepared to provide for \$8,500 debentures for rebuilding the public school.

AURORA, ONT.—S. H. Lundy, Town Clerk, will receive tenders up to October 1st for purchase of \$10,000 4½ per cent. waterworks debentures.

BERLIN, ONT.—The Town Council negotiating with a company for the establishment of agricultural machinery manufacturing works to cost \$300,000.

FERGUS, ONT.—The Council have decided to submit a by-law to the ratepayers to provide for the expenditure of \$40,000 on a system of waterworks.

LONDON, ONT.—A. O. Graydon, City Engineer, will receive tenders up to September 20th for construction of tile sewers on Teresa and Oxford street.

QUYON, QUE.—It is not expected that the Dowd Milling Co., will rebuild their elevator and mill on the old site as the company have another one in view.

LEAMINGTON, ONT.—On September 24th a by-law will be voted on to loan \$30,000 to W. C. Campbell, Detroit, to establish an automobile factory here.

AYLMER, QUE.—E. J. Rainboth, C. E., has prepared plans for new sewerage system at an estimated cost of \$46,000. The plans met the approval of the Town Council.

FORT WILLIAM, ONT.—The Coats Manufacturing Co. of Canada, Limited, have decided to locate their works and head office here for the manufacture of carpets, art publications, etc.

BEAMSVILLE, ONT.—The stockholders of the Hamilton, Grimsby and Beamsville Electric Railway are consider-

ing the extension of the line from this town to St. Catharines.

GANANOQUE, ONT.—W. Lindsay, of the firm of Henderson & Lindsay, has purchased a site at the foot of Charles street which it is understood will be for a new business establishment.

PRINCE ALBERT, SASK.—The City Council gives notice of its intention to construct granolithic sidewalks on Central avenue, cost \$12,700, and on First avenue west, cost \$4,263.

NORTH TORONTO, ONT.—The Ontario Railway and Municipal Board have approved of a by-law to raise \$7,200 for the construction of steel reservoir and other improvements to water works system.

MASSEY, ONT.—Robert Wright, town clerk, will receive tenders up to October 2nd for purchase of \$10,000 waterworks debentures and \$4,000 public school debentures, bearing interest at 4 per cent.

DALHOUSIE, N. B.—Alex. J. Le Blanc, Town Clerk, will receive tenders up to October 3rd for laying 17,000 feet of conduit pipe. Plans with W. Chipman, C. E., 103 Bay street, Toronto, and with above named.

PRESTON, ONT.—Attention is called to the extension of time for receiving tenders for the pipelaying, etc. in connection with the waterworks. Tenders will be received up till 6 p.m. September 22nd. C. R. Hanning, Town Clerk.

STRATFORD, ONT.—J. J. O'Brien of Guelph, purposes erecting a three story brick building on a site purchased on Downie street.—The Board of Works will ask the city council to spend \$15,000 on a storm drainage system for Avon ward.

NELSON, B. C.—F. C. Gamble, Lands and Works Department, Victoria, B. C., will receive tenders up to October 15th for erection of court house here. Plans at office of Public Works Engineer, Victoria, and with Government Agent, this place.

EDMONTON, ALTA.—E. Cheviagny intends building a residence on Tenth street, cost \$2,000.—D. Ross has had plans prepared for residence on Second street, cost \$5,000.—John Somerville & Sons are preparing for the erection of a new business block on First street.

TORONTO JUNCTION, ONT.—The congregation of Annette street Methodist church are considering the enlargement of that edifice.—Ellis & Conroy, architects, Toronto, are preparing plans for a residence here, also for a laundry building and stores with dwelling.

CALGARY, ALTA.—The Imperial Bank have decided to tear down their present building, corner Centre and Main streets, and build a much larger building on the site.—Thomas Ryan & Co., boot and shoe manufacturers, have purchased a site on Seventh avenue west for warehouse and showroom.

SASKATOON, SASK.—Adam Turner will receive tenders up to October 1st for the purchase of \$125,000 five per cent. debentures.—H. S. Griffiths is preparing plans for a new store building 100 x 65 feet to be erected on Twentieth street.

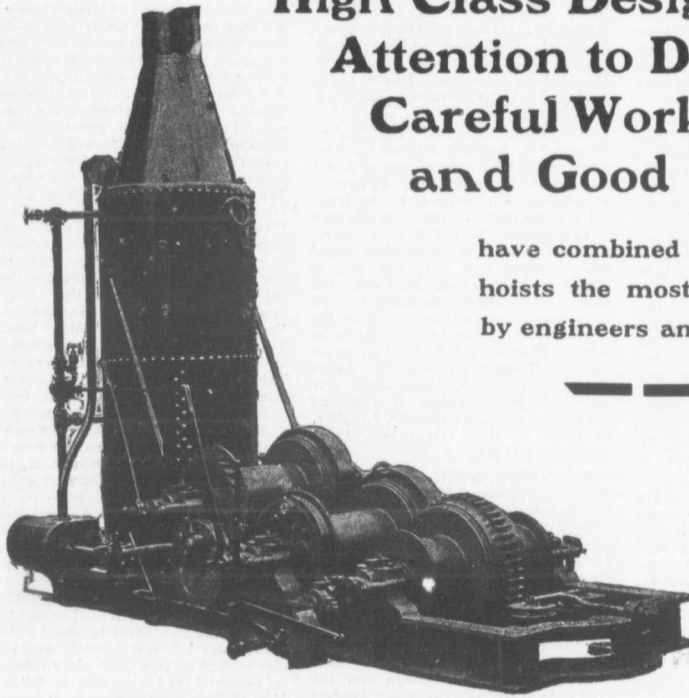
BRANDON, MAN.—The C. P. R. have granted the G. N. R. union depot facilities and it is expected that a union station will be erected.—The C. N. R. have purchased property on Ninth street as a site for a new station.—The City gives notice of its intention to construct granolithic sidewalks on Sixteenth street, Van Horn, and Rosser avenue.

PORTAGE L'APRAIRIE, MAN.—Plans are being prepared for addition to

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Attention to Detail
Careful Workmanship
and Good Material**

have combined to make our
hoists the most sought after
by engineers and contractors



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a large variety, one of which will
surely meet your requirements; if
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W.H.C. MUSSEN & CO.

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MONTREAL

19, 1906

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the land titles office.—The Parks Board will receive tenders up to September 27th for trenching, pipe laying, etc., for 3,800 of 18 inch tile pipe.—It is expected that Elliott, Crosier & Robinson, Minneapolis, will establish a large factory here.

CHARLOTTETOWN, P. E. I.—D. Pottinger, Moncton, N.B., will receive tenders up to September 22nd for construction of an erecting, machine and blacksmith shop at this place for the Prince Edward Island Railway. Plans at Resident Engineer's office, at Department of Railways and Canals, Ottawa, Ont., and at office of Chief Engineer, Moncton, N.B.

CARMAN, MAN.—On September 29th a by-law will be voted on to raise \$1,500 for erection of school building in school district of Stephenfield.—Daring & Pearson, architects, Winnipeg, will receive tenders up to September 26th for erection of building for the Canadian Bank of Commerce.—H. Armstrong will receive tenders up to September 22nd for painting the Methodist church here. Plans at office Dr. McLachlan.

CARDSTON, ALTA.—John Stocks, Deputy Minister of Public Works, Edmonton, will receive tenders up to September 20th for supply of materials and erection of Court House building here. Plans at Department of Public Works, Edmonton; with Inspector of Public Works, Calgary; and with John W. Woolf, M.P.P., Cardston; W. C. Simmons, M. P. P., Lethbridge and M. McKenzie, M. P. P., Macleod.

WOODSTOCK, ONT.—A by-law has been carried to loan \$25,000 to the Canadian Bearings Co., of Hamilton, to locate their factories here.—The Bain Wagon Company are having plans prepared for an extension to their factory, 120 by 60 feet.—The ratepayers of West Zora township have carried a by-law to loan \$15,000 to the St. Mary's & Western Ontario Railway for the proposed line from St. Mary's to Embro.

VICTORIA, B.C.—Tenders will soon be called for the new block, corner Fort and Wharf streets, for Pither & Leiser, for which plans are being prepared by Hooper & Watkins, architects. It will be a five story and basement building, 114 by 80 feet, constructed of pressed brick and stone.—The Dominion Government purpose erecting a detention hospital for immigrants from the far east.

PETERBORO, ONT.—E. M. Elliott, County Clerk, has taken tenders for plumbing, heating and wiring of new County House of Refuge.—Tenders are to be called for electric wiring of new fire hall.—The revised plans of Architect Blackwell for new Isolation Hospital have been approved by Board of Health, cost \$5,500.—The formation of a company to erect a new hotel is being considered.—The Building Committee of the Board of Education are having plans prepared for the Collegiate Institute building.

HAMILTON, ONT.—A committee has been appointed to procure plans, etc., for a proposed Y. M. C. A. building for the east end. P. C. McGregor is interested.—The new Central church building to replace the one recently burnt is designed after an old English Cathedral, cost \$150,000.—Building permits have been issued as follows: Bollinger-Andrews Construction Co., seven story, brick, barrel warehouse on King William street, cost \$26,000; W. A. Stevens, seven dwellings, corner Main and Regent street, cost \$9,450, two dwellings, Melburne street, cost \$2,700 and one dwelling on Barton street, cost \$1,350.

VANCOUVER, B.C.—The Bank of Montreal purpose enlarging their building here on Granville street.—A Thea-

tral Syndicate are negotiating for the Loo Gee Wing property corner Hastings and Abbott streets, for a theatre building.—Building permits have been issued as follows: P. Burns & Co., abattoir, east end, cost 200,000; W. H. Mason, business block, corner of Tenth and Westminster avenue, cost \$10,000; Reilly Bros., frame dwelling, Barnard street, \$1,700; P. Tardif, two frame dwellings, Comox street, \$5,000, M. W. Flewelling, frame dwelling, 264 A, \$1,400; W. Robertson, residence, Pendrill street, \$3,000, E. J. Deacon, building, Hardwood and Nicola streets, \$10,000; W. H. Dickson, dwelling, Harris street, \$2,000; E. Fletty, dwelling, Gore avenue, \$3,000.

MONTREAL, QUE.—The Quebec, Montreal & Southern Railway Co. have taken tenders for construction of a railway road bed from St. Francois river at Pierreville, Que., eastward to the Intercolonial Railway at Nicolet, a distance of 14½ miles.—The C.P.R. have surveying parties at work on sections of the new proposed line from this city to Toronto.—L. O. David, City Clerk, will receive tenders up to September 21st for brick, terra cotta and concrete work for the new No. 5 fire station, Berthelet street. Plans with A. F. Dunlop, architect, 72 Temple Building, St. James street.—The Road Department give notice of their intention to construct sewers in Fulum, Sherbrooke, Langlois, St. Remi, St. Mary, Dagenais, Selkirk and Ropery streets.

WINNIPEG, MAN.—The Canadian Northern Railway are inviting tenders for the erection of engine shops here.—New plans are being called for, for the proposed sub-station for the receiving of electrical energy from the Winnipeg General Power Co.—John Schwab, architect, will receive tenders up to 19th inst. for erection of a brick building on Austin street for H. Finsilver.—The Committee on Works will receive tenders up to November 20th for erection of steel superstructure for highway bridge over the Red river at Redwood avenue. Tenders will be received up to October 16th for erection of concrete piers and abutments for support of the bridge. Plans at office of Col. H. N. Ruttan, City Engineer.—James McCready Co., Montreal, have purchased a site on McDermot avenue and intend to erect a large wholesale shoe warehouse.—The following sewers have been recommended: On Notre Dame avenue from Downing street to the first bend west, cost \$8,250 and on St. John's avenue from McGregor street to Mackenzie, cost \$1,450.—The Health Committee will receive tenders up to September 27th for erection of septic tank and drains in connection with the Quarantine hospital. Plans with C. H. Wheeler, architect.—S. Mulvey, Secretary P. S. Board will receive tenders up to October 4th for supply of adjustable school desks.—The C.P.R. propose constructing a number of branch lines: From Moose Jaw 50 miles northwesterly; from Weyburn a distance of about 36 miles; an extension to the Stonewall branch from Teulon northerly about 20 miles; an extension of West Selkirk branch from Winnipeg beach to Gimli, 10 miles; from Lauder to Broomhill, 20 miles and a branch from near Darlingford southerly, about six miles.

TORONTO, ONT.—Ellis & Conner, architects, are preparing plans for a residence on Palmerston Boulevard for which tenders will soon be called.—Same architects are preparing plans for a house and also a laundry building with stores and dwelling at Toronto Junction.—Tenders are wanted for the erection of a pair of semi-detached houses. Plans at 157 University avenue. F. H. Herbert, architect, 9 Toronto street, will receive tenders

up to September 21st for the erection of a large residence on Springhurst avenue.—D. Egerton Ryerson, Secretary-Treasurer Toronto Public Library Board, will receive tenders up to October 10th for erection of the new Public Reference Library building. Plans with Wickson & Gregg, architects, and A. H. Chapman, assistant architect, 59 Yonge street.—Plans for the new High school building, corner Gerrard and Leslie streets, have been approved and tenders for work will soon be called.—Tenders are invited up to September 20th for the erection of a concrete building near the Don for the Carriage Mountings Company. Plans with John S. Fielding, 15 Toronto street. Tenders will be received at the same time for air compressor, pneumatic tools and appliances.—Tenders are invited for plastering and brickwork for a pair of houses 497 and 499 Eastern avenue.—Tenders are invited for building a four roomed cottage 7 Wellington avenue.—Plans have been prepared for the new island bathhouse to replace Turner's baths on the western sandbar, estimated cost \$8,500.—The Royal Bank will soon begin work for the construction of their new building on King street east, near Yonge.—The Norway Public School Trustees are considering the erection of a two-roomed school on Reid avenue.—The W.C.T.U. are planning for the erection of a new building for their headquarters.—The plans for the laying of 17,000 feet of conduit pipe for the waterworks, Dalhousie, N.B., may be seen at the office of Willis Chipman, C.E., 103 Bay street. Tenders for the work will be received up to October 3rd.—A. A. Barthelmes, formerly of A. A. Barthelmes & Co., has purchased a site on Carlaw avenue on which he will erect a factory for the manufacture of automatic self playing pianos.—City Engineer Rust has recommended a site on Manning avenue for the new asphalt plant.—The Canadian Shipbuilding Co., desire to obtain a lease of the water lot near Queen's wharf as they wish to enlarge their plant.—Building permits have been issued as follows: Mrs. M. Tilley, 2-story brick and stone dwelling, 57 St. Anne road, cost \$2,400; Mrs. E. E. Jermyn, 2-story brick and stone dwelling, 292 Avenue road, cost \$2,500; Wm. Legg, 2-story brick veneer dwelling, 41 Hamburg avenue, cost \$1,700; Geo. C. Watson, 3 pair 2-story brick dwellings, Sorauren avenue, cost \$13,500; George Weston, 2-story and attic brick dwelling, Palmerston boulevard, cost \$12,000; Simon J. Breen, 2-story brick and stone dwelling, Howard Park avenue, cost \$3,000; Mrs. L. Marshall, 3-story brick and concrete store, Queen street east, near Lee ave., cost \$4,000; Geo. McGuire, 2½-story brick dwelling, corner McMaster avenue and Avenue road, cost \$4,500; J. J. Walsh, 2-story brick and stone dwelling, on Fort Rouelle avenue, cost \$3,500; Mrs. Crawford, 2-story and attic brick dwelling, corner Parliament and Aberdeen streets, cost \$2,950; E. C. Tuckett, pair 2-story brick and stone stores and dwellings, Dundas street, near Chelsea, cost \$4,500; N. Abenier, 2-story and attic brick dwelling, Roxborough avenue, near Avenue road, cost \$5,000; Andrew B. Ingram, 2-story and attic brick and stone dwelling, Palmerston boulevard, cost \$6,000; A. Pike, pair 2-story brick dwellings, Gracestreet, cost \$5,000; Duttan & Wright, 2-story frame dwelling, Emerson avenue, cost \$2,000, John Drury, 2-story brick store, 1014 Bloor street, cost \$2,500; W. Dixon, 2-story brick dwelling, Shaw street, near Bloor, cost \$3,000; A. P. Mather, 2-story brick dwelling, Radford street, cost \$2,600; Wm. Murray, 2-story brick dwelling, Kendall avenue, cost \$3,500; A. Wilkins Co., 4 pair 2-story brick dwellings, Avenue road, near Roxborough avenue, cost \$20,000; V. A. Atkinson,

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pair 2-story and attic brick dwellings, Beatrice street, cost \$4,500; T. Eaton Co., Limited, 2-story brick automobile garage, Albert street, cost \$25,000; S. Burrows, 2½-story brick dwelling, Delaware avenue, cost \$4,300; R. Vaughan, 3 pair 2-story and attic brick dwellings, Macpherson avenue, cost \$15,000; G. L. Francis, 2-story and attic brick addition to dwelling, 38 Crescent road, cost \$1,800; W. T. Giles, 2-story and attic brick dwelling, 77 Chestnut Park road, cost \$8,000; W. C. Mathews, 2-story and attic brick dwelling, 8 Chestnut Park road, cost \$10,000; Geo. Belbin, 2-story brick and stone dwelling, 139 Clinton street, cost \$3,000; H. Galbraith, 2 pair 2½-story brick dwellings, cost \$2,800; J. McGougal, 2½-story brick dwelling, Langley avenue, cost \$2,500; W. J. Ingram, pair 2-story and attic brick dwellings, 188 and 100 Delaware avenue, cost \$6,600; Methodist Tabernacle, 1-story brick church, 648 Markham street, cost \$8,000; S. Loree, 2-story and attic brick dwelling, Schiller avenue, cost \$8,000; G. H. Thornley three 2-story brick dwellings, Gladstone avenue, cost \$6,500; Mrs. W. H. Preston, 2-story brick and roughcast store and dwelling, corner Greenwood and Danforth avenue, cost \$2,500; S. A. Leveck, 2-story brick store and dwelling, Hallam street, cost \$2,500; John Rennie, 2½-story brick dwelling, corner Elm avenue, and Sherbourne street, cost \$7,900; Union Bank, alterations to brick bank, 19 Wellington street, cost \$8,000; S. Smith, 2-story brick dwelling, Lindsay avenue, cost \$2,500; 2-story brick dwelling, Woolfrey avenue, cost \$2,500; Thos. McMillwin, 2-story brick and stone dwelling, Triller avenue, cost \$3,500; Pape Avenue Baptist church, brick and wood church, Pape avenue, cost \$6,000; S. A. Weismiller, 2 pair 2½-story brick dwellings, near Marion street, on 93-99 Lansdowne avenue, cost \$10,000; Planet Bicycle Co., 4-story brick bicycle factory, 69-71 Queen street, cost \$6,500; Fred S. Duff, pair 2½-story brick and stone dwellings, 107-109 Beatrice street, cost \$5,500.

FIRES.

Methodist church, planing mill and several dwellings at Shawville, Que., loss \$100,000.—Sincclair McKiel's bakery, St. John, N.B., loss \$5,000.—Residence of Andrew Kerr, Miramichi road, Bathurst, N.B., loss \$2,500.—Residence of M. Malins, Second street, New Westminster, B.C., loss \$2,000.—Planing mill and part of plant of Mine Centre Lumber Company, Mine Centre Ont., completely des-

tpoyed.—Adelphi Hotel, A. Campbell's store, Morrison & Johnson's warehouse, Blindmen Electric Light Company's office and several other buildings at Lacombe, Alta., loss about \$100,000.—Methodist church, public hall, store and dwelling of Dr. Curtis and several other buildings at Murray, Ont., completely destroyed.—Hardware store of N. Wilmer and buildings of W. Lein at Trail, B.C., loss \$11,000.—Jacob Koehler's barns with contents, completely destroyed. The loss is heavy.—Planing mill of Wm. Geary, London, Ont., loss \$23,000.—Massey-Harris warehouse and other buildings at Pilot Mound, Man., loss \$15,000.—Grand View Hotel, Cordova street, Vancouver, B.C., damage \$2,000.—Novelty Works, Wiarton Ont., completely destroyed.

CONTRACTS AWARDED.

CARNDUFF, SASK.—Erection of Baptist church: Steadham Bros., contractors.

ORILLIA, ONT.—\$10,120 drainage debentures: Wm. C. Brent, Toronto, purchaser, \$10,481.

CHARING CROSS, ONT.—Heating system in Methodist church: Kelsey Manufacturing Co., contractors.

VICTORIA, B. C.—Construction of wharf and warehouse for the C.P.R.: Walter Hepburn, contractor, Vancouver.

PORT ARTHUR, ONT.—Construction of temporary pile breakwater: Canadian Northern Coal & Ore Dock Co., cost \$13,000.

WINCHESTER SPRINGS, ONT.—Construction of concrete bridge: Steel Concrete Co., of Montreal, contractors, cost \$3,000.

GLACE BAY, N. S.—Construction of buildings for the Marconi Co.: Rhodes, Curry & Co., Amherst, N.S., contractors, cost about \$30,000.

ST. BONIFACE, MAN.—Construction of asphalt block pavement on Provencher avenue: Langley & Cook, Walkerville, Ont., successful tenders at \$3.57 per square yard.

LEVIS, QUE.—Alterations for central fire station building: Masonry, Joseph Couture, \$1,694; carpentry, George Roy, \$3,300; plumbing, Gingras & Nadeau, \$220; electric work, Edgar Lemieux, \$85.

PORTAGE LA PRAIRIE, MAN.—Factory building for London Fence, Limited: Brickwork, Carr & Woodman; carpenter work, A. McLarty; painting, Semple & Cameron; plumbing, Johnston & McClymont.

TORONTO JUNCTION, ONT.—Buildings for Dominion Carriage Co.: Masonry Elgie & Page; carpentry, Thomas Sproul.—Buildings for Francis-Frost Co.: Masonry, Teagle & son; carpentry, Frank

Armstrong. Ellis & Connery, Toronto, are architects for both structures.

OTTAWA, ONT.—The lowest tenders for the eight steel bridges on the eastern section of the Transcontinental Railway between Levis and La Tuque were received from the Dominion Bridge Company and the Locomotive & Machine Company of Montreal. The former tendered for bridges at Batiscan, Jacques Cartier, Riviere Charest and the C. P. R. crossing in Portneuf county for about \$100,000. The latter company tendered for about \$60,000 to construct bridges at Riviere Noir, Riviere aux Pommes, Ste. Annes and Portneuf.—Plumbing and steam fitting for new opera house on Queen street: F. R. J. Macpherson, Peterboro, contractor.

TORONTO, ONT.—The following tenders have been accepted by the Property Committee of the Board of Education: Enlargement of Kew Beach school—Mason work, John McLeod, \$5,850; carpentering, F. Westlake & Son, \$5,400; plastering, E. Warren, \$840; painting, J. Phinnemore, \$575; roofing and tinsmithing, A. B. Ormsby Co., \$997; structural steel work, Read & Brown, \$410; heating and ventilating, W. F. Rutley Co., \$845.—Enlargement of Dewson Street school—Masonry, John McLeod, \$5,545; carpentering, Joseph Hoops, \$7,850; plastering, E. Warren \$1,160; painting, T. Barrett, \$825; plumbing, Lewis Legrow, \$526; roofing, R. Rennie & Son, \$352; tinsmithing, W. Dillon & Co., \$325; structural iron work, F. H. Shipway Co., \$996; heating and ventilating, Fred Armstrong Co., \$3,200; thermostats, N. E. Nash, \$890.—Erection of new school on Phoebe Street (27 rooms)—Carpentering and masonry, John McLeod, \$67,545; plastering, E. Warren, \$70,16; painting, Jas. Taylor, \$2,725; plumbing, Fred Armstrong Co., \$2,595; roofing and tinsmithing, A. B. Ormsby Co., \$1,783; heating and ventilating, Fred Armstrong Co., \$14,696; thermostats, Johnston Heat Regulating Co., \$1,545.—Improvement of Essex street school—Steel construction, Reid & Brown, \$260; heating and ventilation, W. F. Rutley Co., \$995.—Improvements of Withrow Avenue school—Structural steel, McGregor & McIntyre, \$233; heating and ventilating, \$905.—Palmerston Avenue school—Plumbing, Lewis Legrow, \$226.

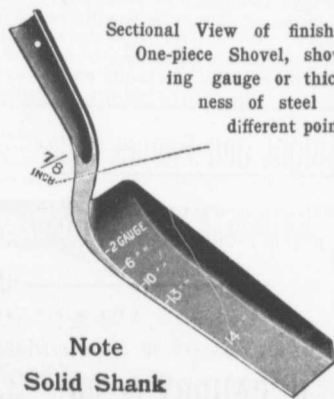
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A NOVEL INDIAN DREDGER.

Under the direction of Sir A. M. Rendel, K. C. I. E., consulting engineer for the Indian Government, there has recently been built and shipped by Messrs William Simons and Co., of Renfrew, a dredger of a special kind, designed by Mr. O. C. Lees, of the Bengal Public Works department. It is a suction-pump triple-screw steam dredger, to be used for opening up new waterways and improving the depths of shallow canals or waterways, and for depositing the dredged material upon or beyond the banks of the waterways at great distances. The vessel is 250ft. in length by 45ft. beam by 18ft. depth. The hull takes an unusual form forward, having three separate bows abreast of each other, thus forming two open wells, and each bow contains a suction frame through which the material is drawn on board for discharge on shore. Each suction frame has two suction orifices or nozzles, in front of which are two patent rotary cutters for cutting and disintegrating clayey material which otherwise would be unsuitable for suction-pump dredging. Each suction frame is also provided with a system of water jets delivered under great pressure, designed to agitate compact sand which might not be resistant enough to warrant the employment of the rotary cutters. The cutters are driven by bevel and spur gearing from an independent four-cylinder tandem compound engine, and are of cast steel, of special form made under Robinson's patent. Each suction frame is controlled by independent hoist gear driven by a two-cylinder engine. The two centrifugal sand suction pumps, each driven by an independent set of vertical triple-expansion engines of 900 I. H. P., are specially constructed with wide space to permit of the passage of large pieces of debris, and have a nominal dredging capacity of 4,000 tons of sand per hour from a depth of 20ft. The cutters and suction nozzles operate upon a width of 20ft. The pumps deliver the material dredge direct through a floating pipe line 42 in. in diameter, which may be 600 ft. in length. On a terminal or shore-end pontoon are appliances which raise the pipe-line to a height of 20

ft. about water level, and the material is finally discharged over the canal bank to a distance of 100 ft. from the centre of the pontoon. The special feature of the pontoon is an outboard balance-weight, carried on heavy davits, and so arranged as to maintain the truss of the pontoon, irrespective of whether the embanking pipe is full or empty. Another feature of the dredger, which is to be named "Foyers," is that she is fitted with three four-bladed propellers of large surface, each driven from a separate set of vertical compound surface-condensing engines of sufficient power to propel the three-bowed hull at a speed of eight knots. Steam at 200 lb. working pressure is provided by four Babcock and Wilcox water-tube boilers, fitted with reducing valves as required for auxiliary engines. There are a large number of separate engines and auxiliaries for pumping and other purposes on board. One main condenser is provided to take steam from the installation, the condenser itself being fitted with a complete outfit of steam-driven air and circulating pumps.

BUILDING DURING AUGUST.

In Toronto during the month of August 470 building permits were issued the approximate value of which is \$1,271,620. This makes a total of 2,409 permits issued from the beginning of the year and the same are valued at \$8,660,525. For the first eight months of 1905, 1,873 permits were issued the value of which was estimated at \$7,068,779.

In Winnipeg the value of buildings contracted for totalled \$1,125,000 for the month of August and \$9,250,000 for the first eight months of the year. A slight decrease is noted when compared with the figures of 1905, which were \$1,289,650 for the month of August and \$9,300,000 from January 1st to August 31st.

In Regina 60 building permits were issued during August the value of which is placed at \$326,000, making a total of \$1,363,003 up to August 31st.

Building permits in Edmonton for the month of August were valued at \$212,165 making a total

of \$1,225,590 for the eight months of the year.

PERSONAL.

Mr. Charles Brandeis, Consulting Engineer of Montreal, has been retained by the Town of St. Laurent, Que., for the improvement of their water works system.

Mr. R. R. Keelay, city engineer, Edmonton, Alta., has received notification that he has been elected a member of the National Geographical Society of the United States.

Mr. Harry Charlesworth, formerly of Woodstock, Ont., now an employee of the contracting firm of Miller & Harvey, Toronto, has been appointed secretary pro tem of the building committee of the new Toronto General Hospital.

Mr. John S. Fielding, C. E., was in Hespeler on Wednesday, the 12th inst., and made a final inspection of the new concrete dam there for the R. Forbes Woolen Mills Company, preparatory to turning the water in on the new structure. The last piece of coffer-dam was removed and the reservoir allowed to fill up. The result was eminently satisfactory to the proprietors, who are pleased to know that they will now be able to save a great deal of water that formerly was lost by leakage through the old wooden and stone dam. The new dam is absolutely tight, has a large margin of strength and has been built at a very moderate cost. The height varies from 11 to 16 feet, and the total length is 220 feet.

J. J. Fisher, contractor, Brantford, Ont., has made an assignment.

Dohoney & Donovan, contractors, Reed's Station, Que., have registered their business.

Louis Kemp, plumber, Vancouver, F. C., will be succeeded in business by Moscrop Bros.

Henri Bertrand and Joseph V. Bertrand, carpenters, Montreal, have registered under the name of Bertrand Freres.

Eugene F. Paris and Mastai Gagne, painters, Montreal, have registered under the firm name of Paris & Gagne.

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NEW COMPANIES.

American Machine Telephone Company, Limited, Brantford, Ont., incorporated, capital \$450,000. Directors, H. N. Baker, A. E. Knox and T. E. Moulden, all of Toronto.

Chemical Laboratories Limited, Toronto, Ont., incorporated, capital \$50,000. Directors, R. H. Parmenter, A. J. Thomson, and R. C. Steele.

Hensall Foundry & Manufacturing Company, Limited, Hensall, Ont., incorporated, capital \$40,000, to manufacture and sell plumbing and heating supplies, etc. Directors, F. C. Hunt and O. L. Robb, of London, and A. Brandt, of Hensall.

Hurley Machine Company, Limited, Toronto, Ont., incorporated, capital, \$40,000. Directors, Walter

Gow, J. S. Lovell, E. W. McNeill, W. F. Ralph and Robert Gowans.

Canadian Coal & Navigation Company, Limited, Tillsonburg, Ont., incorporated, capital \$500,000. Directors, E. C. Jackson, G. W. Tillson, V. A. Sinclair, E. V. Tillson, S. H. Belts and C. H. Denton.

Seaboard-Prairie Land Company, Limited, Lewisville, N.B., incorporated, capital \$149,000. Promoters F. C. Tait, Shediac, N. B., H. H. Smith, and H. McDougall, Halifax, N. S., W. H. Edgett, Moncton, N.B., and others.

Iroquois Motor Car Company, Limited, Welland, Ont., incorporated, capital \$96,000. Promoters, J. F. Mills, Buffalo, N.Y., D. Scott, Ottawa, Ont., A. Griffiths, G. W. Sutherland, Welland, Ont., and others.

Globe Construction Company, Limited, Winnipeg, Man., incorporated, capital \$5,000. Promoters, J. W. Henderson, F. R. Mayotte, T. Newell, L. G. Anderson and T. N. Neilson.

E. K. Watson & Company, Limited, Montreal, Que., incorporated, capital \$20,000, to carry on the manufacture of machinery, hardware, etc. Promoters, J. H. Parkes, Sutton, Eng., E. K. Watson and G. A. Savage, Westmount, Que.

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CIVIL ENGINEERS' EXCURSION.

The members of the Canadian Society of Civil Engineers, who are at present on a tour of western Canada, arrived in Winnipeg on Tuesday, 10th inst., on the private train supplied to them by the Canadian Pacific railway. At the depot the party were met by Col. Ruttan, and members of his staff from his office, by Mayor Sharpe, Aldermen Latimer, Sandison and Pulford, representing the city council, representatives of the engineering department of the C. P. R., and a number of other Winnipeg people who have friends on the train.

A list of the arriving travellers as furnished by Professor McLeod is as follows: A. Amos, C. W. Archibald, and Mrs. W. D. Baillairge, N. T. Bertrand, Miss Bray, Mrs. Boyd, W. A. Bucke, R. de B. Corriveau, E. L. Cousins, Mr. and Miss Chanute, F. A. Drought, J. Duchastel, G. H. Frost, J. G. Greay, S. Groves, Colonel Jones, Mr. and Mrs. T. H. Jones, F. S. Keith, J. Kennedy, W. Kennedy, Captain B. Lindsay, Mr. and Mrs. La Violette, C. de B. Leprohon, Mr., Mrs. and Master Miller, C. H. Mitchell, G. D. MacKinnon, W. A. Murray, T. C. McConkey, Professor C. H. McLeod, Mr. and Mrs. N. M. McLeod, Mr. and Mrs. R. F. Ogilvy, Professor R. B. Owens, Mr. and Mrs. Papineau, the Misses Paverley, Professor J. B. Porter, Mr., Mrs. and Miss Ross, S. F. Rutherford, Dr. E. Seaborn, F. P. Shearwood, Mr. and Mrs. Frank Simpson, Miss Smith, Mr. and Mrs. W. J. Sproule, L. A. Surveyor, Mr. and Mrs. Sweet, E. VanWinkle, Mr. and Mrs. Walker, Mr. and Mrs. James White, the Misses Wicksteed.

On arrival the visitors registered at the Royal Alexandra, and spent a few minutes preparing for the trip to the yards of the C. P. R., which was scheduled for half-past ten. At this hour the party returned to their train to which a yard engine was attached, and the run out to the works of the company was made. Two hours were spent in the inspection of the various buildings and their contents, the visitors expressing much surprise at the great extent of the yards and the class of machinery installed. On returning to the city the party boarded cars and were taken to Deer Lodge, where the engineers and their party were the guests of the city. After

luncheon the return to the city was made, and the afternoon was spent in going around the city.

To the great regret of the engineers the president of the society was unable, owing to ill-health, to make the trip with them this year. H. D. Lumsden, of Ottawa, fills this important place in the society at the present time. Professor C. H. McLeod, of McGill university, Montreal, is in general charge of the interests of the travellers during the trip.

The most distinguished engineer in the party is Octave Chanute, of New York city, who with his daughter, Miss Chanute, is a guest of the society. Mr. Chanute is a past president of the American Society of Civil Engineers and has been for the past thirty years one of the best known engineers on the continent. He has been retired from the active work of his profession for several years, but still takes a very keen interest in everything pertaining to it, devoting the most of his time to aerial navigation and special railway problems.

Tuesday night the party left for Calgary, Banff and Logan was reached on the 13th, Glacier on the 14th, and Vancouver on the 15th.

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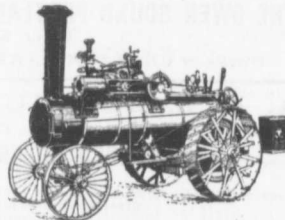
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MACADAMIZED ROADS AND DUST*

One of the requirements of a macadamized road on which horse traffic is used is that it shall be slightly elastic. Theoretically an unyielding surface may be better for vehicles; but practically a considerable amount of wear will ensue both to the road and to the vehicle unless the road surface is slightly responsive to any jar. For the horse a slightly yielding surface is imperative. This vital requirement of elasticity is really one of the chief causes of the trouble experienced with dust.

It has been pointed out that a cubic yard of metalling 2 in. to 2 1/4 in. cube, when screened and laid down in regular layers of 6 in. thick, contains no less than 40 per cent. of interspaces. These interspaces have to be filled with smaller material, some of it gravel or sand, but most of it fine dust or mud, accord-

ing to the state of the weather and the character of the road stone. The function of this soft intervening material is to form a cushion to preserve the stone from the heavy blows of the traffic and to absorb the shock that would otherwise be unpleasantly felt by the horse or the vehicle. The character of the intervening cushion thus becomes important, for if when the road surface dries it is converted into a fine mobile dust that is easily dispersed, a stone gets kicked out, and an opening is made which, if not quickly attended to, will soon result in the disintegration of the road. The way in which some of the material used for metalling is affected by water adds to this process. It therefore becomes obvious that the best road surface will be that where the material filling the interspaces has a high specific gravity, is not easily pulverized by shocks, and is not reduced to fine dust or mud by the action of the weather.

Another common defect arising also from the same source is that a macadamized road surface rarely for long retains the even convex shape in which it was left by the steamroller. The soft material interspersed between the stones will be greater in one part than in another; consequently, as it gives way or comes out, especially if a stone or two is loosened from the road surface, the road wears away and a hollow is formed.

It has been said, and is very generally believed, that motor-cars are the cause of dust. But motor-cars would not raise the dust if the dust were not already there, either on the surface or in the interstices of the metalling. Everyone will agree that the dust raised by cars is a great nuisance, making other road-users as well as residents by the roadside utterly miserable; but it is better to get at the cause of the trouble than blame the instrument, and the cause is undoubtedly the

*Part of a paper by Mr. A. P. I. Cotterell, M. Inst. C.E., P.S.L., read at the recent Bristol Congress of the Royal Sanitary Institute.

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fine material that lies upon and between the metalling.

It has been pointed out by Mr. O'Gorman that the hollows and the irregularities of the surface are largely the cause of dust raised by motor-cars. It constantly happens that while one driving-wheel is making good and effective contact with the road the other wheel is skipping lightly into a hollow in which a dust puddle may be lying. When a vehicle is moving slowly the wheel has time to traverse the full contour of the hollow, but when travelling rapidly it bounds from the ridge into the midst of the hollow, spinning round meanwhile, and so acts like a brush directly it comes in contact with the dust. The effect of this action is very easily realized.

On every macadamized road there must always be some breaking down of the surface from the pounding of the horse's hoof and the grind of the tire. The only way to deal with this is to get rid of it as quickly as possible, for it does no particular good to the road to leave it there, and it certainly does no good to the road-user or to residents by the roadside. Slow-moving traffic may not disturb it, but directly a motor-car or bicycle comes along the light debris is sent flying; whilst, if there is nothing else, the wind will see that it gets thoroughly distributed.

The more that sand and silicious material is used the less will be the dust produced. Sand, moreover, cannot so easily blow about in clouds, neither can it be churned into a fine impalpable dust, like limestone can be.

There appear to be three directions along which efforts may be made to reduce dust:—

(a) By treating the macadamized surface in such a manner as to retard the formation of dust or fix it when it is formed.

(b) By introducing another substance as a cushion between the metalling in place of the grit and

dust with which the interstices are usually filled.

(c) To use as road material stone of a silicious or basaltic nature less liable to be broken down by wear or dissolved by moisture.

(a) The City Engineer of Bristol has very kindly furnished the results of experiments as to the relative cost of dressing the roads with different dust-preventing solutions. The experiments took place in Coronation-road, Bedminster.

The first preparation was spread on June 24, 1905. Subsequent applications were made on June 26 and 27 and July 4, 5 and 7, six applications in all. At the end of a week there were complaints of the dust rising, but after the fourth, fifth and

sixth applications the road stood fairly well until July 17, when the whole road had to be watered, and it was found necessary to resume the ordinary street-watering on July 29. The cost of this application worked out to 6s. 9 1/2d. (or .0136 of a penny per square yard) per day, as compared with 4s. 4d. (or .0086 of a penny per square yard) per day had ordinary watering been adopted.

The second preparation was applied from July 8 to 17, altogether five applications. The dressing stood till August 17, no water being required during this interval except in channels, which were flushed out once a day from July 28. The cost worked out to 4s. 7d. (or .0091 of a penny per square yard) per day,

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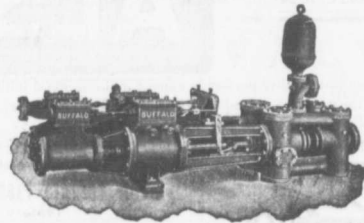
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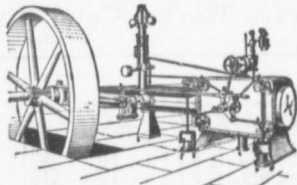
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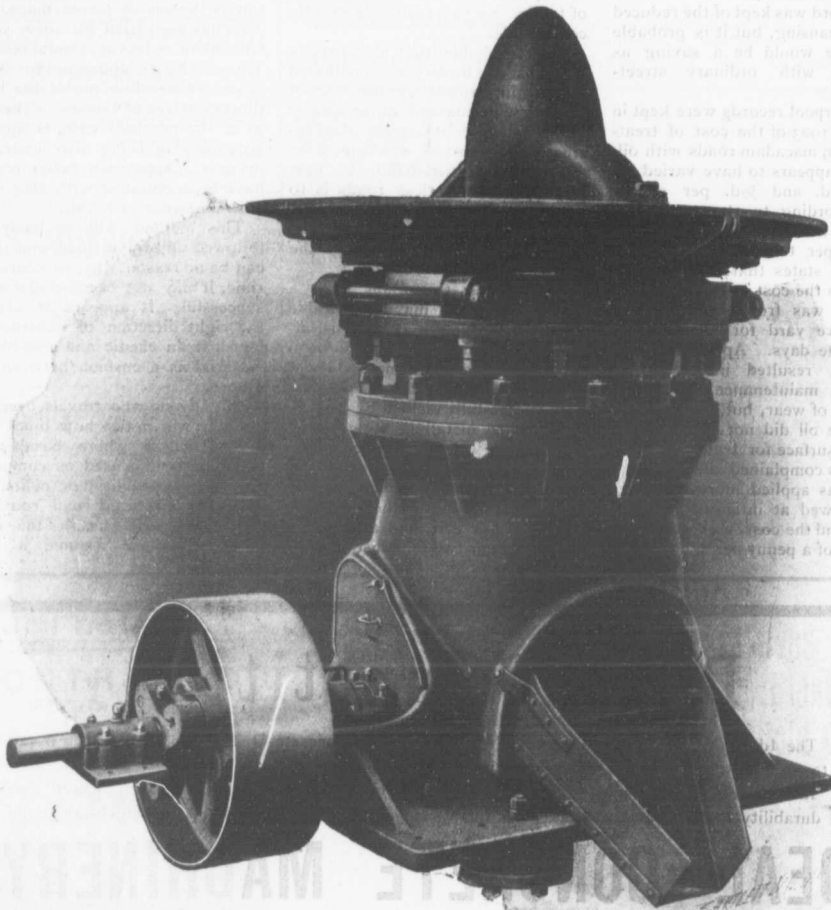
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as compared with 4s. 10d. (or .0096 of a penny per square yard) per day had the road been treated with ordinary water. Those who had formerly complained as to the street watering both spoke and wrote of the good results.

No record was kept of the reduced cost of cleansing, but it is probable that there would be a saving as compared with ordinary street-watering.

In Liverpool records were kept in 1902 and 1903 of the cost of treating certain macadam roads with oil. The cost appears to have varied between $\frac{1}{4}$ d. and $\frac{1}{2}$ d. per square yard, according to the amount of oil used, and Mr. Rathbone, from whose paper these particulars are gathered, states that the total reduction in the cost of cleansing and watering was from 13d. to 5.5d. per square yard for a period of twenty-one days. Apparently the treatment resulted in a distinct saving in maintenance as well as reduction of wear, but, on the other hand, the oil did not form a very pleasant surface for traffic, and the smell was complained of. In 1903 the oil was applied more carefully, and renewed at intervals of three weeks, and the cost was stated to be .0022 of a penny per square yard

per day, as compared with .0033 of a penny per square yard per day, the cost of ordinary street-watering.

The difference in results obtained in Bristol and Liverpool is probably due to factors which have not been noted, such as the kind and quantity of traffic. No two roads are exactly comparable.

It is probable that the trouble from dust can be very much palliated on existing roads by the use of calcium chloride and other similar solutions without appreciably increasing the cost of watering, if at all. On the other hand, the best way to make dustless roads is to use better material. A bad material can never be made permanently satisfactory by simply fixing the surface dust.

(b) Treating the roads with a watering solution may be possible in urban, but, as a rule, it is altogether beyond the means of rural districts, and another method must be found. The dust nuisance has been successfully tackled by coating newly-rolled metalling with boiling tar and pitch. Immediately after the road is formed the tar and pitch is applied in a flat stream from a watering-pot. It is then dressed with fine flint grit, and allowed to stand a day or two for consolidation

before the traffic passes over it. Even with mendip limestone, which is notorious for giving off dust, this method has been found to be successful.

Another example of the second way of overcoming the dust question is the use of tarred macadam. This has been tried for some years with more or less successful results. Tarred slag appears to have answered well in some of the busy thoroughfares of London. The tar, as in the previous case, is applied hot, the slag being also heated to dryness. Apparently better results have been obtained with slag than with limestone or basalt.

This method will probably be followed up still further, and there can be no reason why, in course of time, it may not become uniformly successful. It appears to aim in the right direction of substituting for dust an elastic and non-friable material as a cushion between the stones.

(c) Anyone who travels over the country will notice how much less dust there is where basaltic or silicious stone is used as compared with limestone, lias, or oolite. If every macadamized road could be made up with basalt the dust question would assume a very

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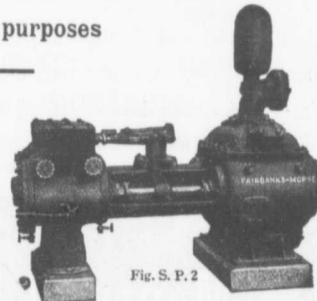


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different aspect. It is not only that such roads are less easily broken down by weather, but the material, being of greater specific gravity, is not so easily moved by wind. The argument against the more general use of basalt, in districts remote from basaltic quarries, is its cost. But it does not necessarily follow that a material which is cheapest in first cost will be cheapest when the cost of maintenance is taken into account.

In Bristol we have about 234 miles of macadamized roads, of which thirty-two miles are repaired with basalt and the remainder with local mountain limestone. We have been considering the advisability of repairing an additional thirty-two miles with basalt.

The effect of the increased use of granite will be to increase the expenditure for four years, and afterwards to decrease it, so that on an average of thirteen years the actual additional outlay will be only 354l. per annum. Against this must be set the saving in cleansing and watering, which is always less with granite than with limestone, so that the probabilities are that the granite road will cost less to the ratepayers than the limestone one, although the limestone quarry that would be

given up is worked by the city itself, and lies close to the river in one of the finest possible positions for supplying stone economically.

This may be an answer to the natural argument that expenditure in dust-prevention may be all very well for towns, but quite out of the question in the country, for in many parts it is possible, by means of a bold capital expenditure, to provide a better and less dusty road at practically no greater cost to the ratepayers, especially if a short-period loan can be obtained. The City Engineer has also kindly furnished results of some tests made by him into the wearing properties of different classes of stone. The first test was in Clarence-road, New Cut, where ten different kinds of stone were tried. Three basaltic areas outlasted the period of the test. The basaltic stones also gave off less debris as measured by the loads of slop removed.

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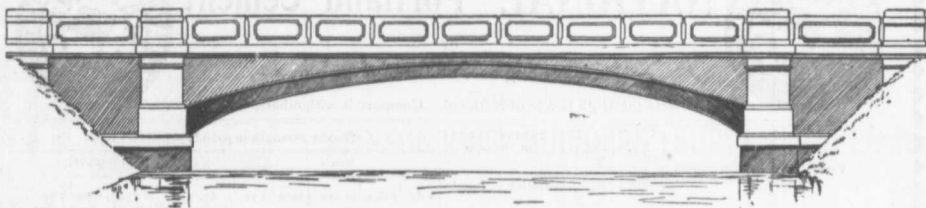
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The falsework consists of two parallel rows of rectangular 9 x 9-ft. steel towers, 50 ft. apart, with their centers coincident with the panel points of the trusses. The towers are braced together longitudinally and transversely, so that two pairs of single towers make one large

tower separated from the next by an open panel, except at the river end, where six towers are placed together making the large tower double. The falsework is equal to standard railroad viaduct work in point of careful design, strength, standard construction, quality of material, rigid inspection and workmanship. Each tower is built with four vertical posts, two of which, nearest the river, are extended from about 10 to 80 ft. higher than the others to carry on each side of the bridge a 12-ft. gauge traveler track, with its center line 18 ft. clear of the truss center. These extended posts are braced to the main towers with outside inclined posts forming a reversed batter and intersecting the tower at about the middle of the short posts.

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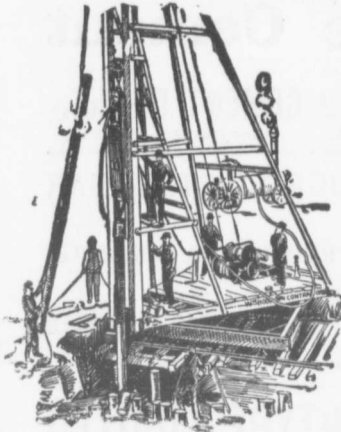
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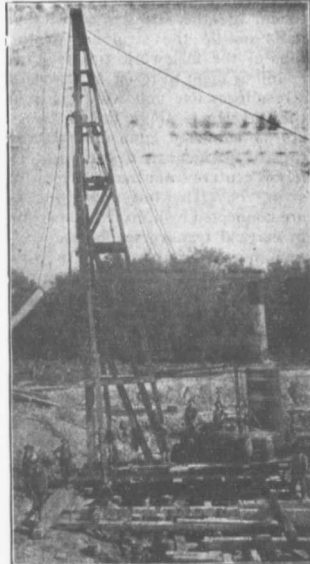
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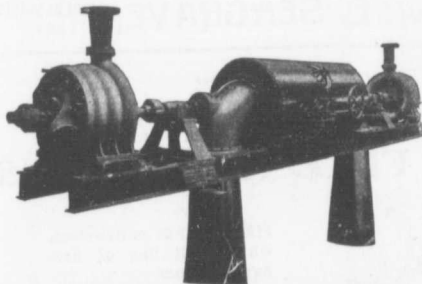
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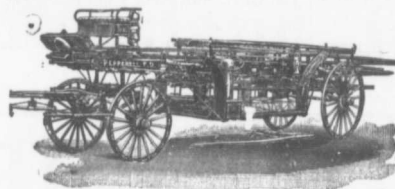
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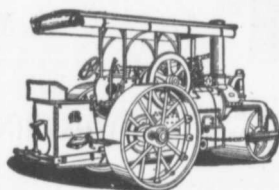
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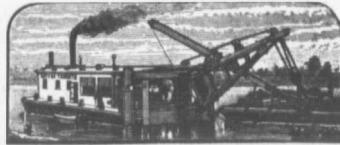
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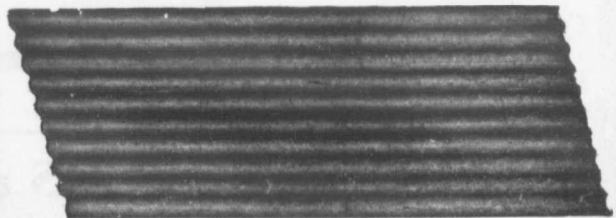
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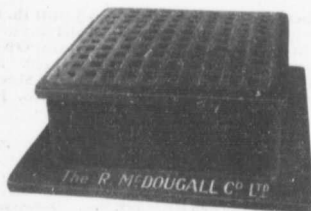
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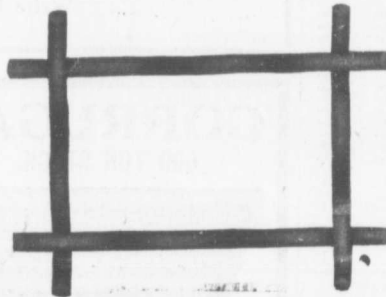
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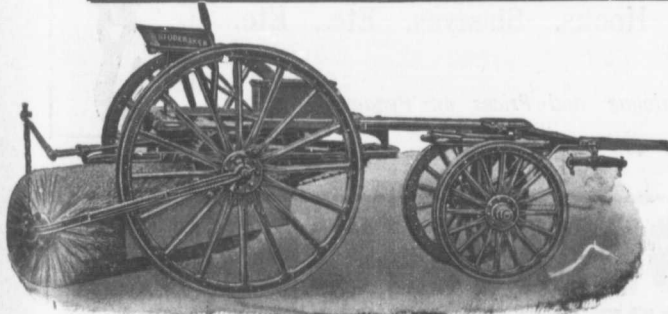
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