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CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL

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. 8.

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No. 23

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TENDERS FOR GRANOLITHIC WALKS

The Town of Listowel invites tenders for the construction of Granolithic Sidewalks to laid in the Town the present season. About 18,000 square feet are now passed by the Council. Specifications and forms of tender may be had by applying to the Town Clerk. Tenders will be opened on MONDAY EVENING, JULY 19TH. The lowest or any tender not necessarily accepted.

W E. BINNING,
Town Clerk.

Listowel, July 5th, 1897.

RENFREW, ONT.

WATER WORKS AND SEWAGE WORKS

Plans and specifications may be seen at the office of the Town Clerk, Renfrew, or at the office of the Chief Engineer, 103 Bay Street, Toronto, on and after July 10th, 1897.

It is the intention to open tenders for these works about July 23rd, 1897. Exact date given later.

WILLIS CHIPMAN,
Chief Engineer.

J. K. ROCHESTER,
Town Clerk.

CONTRACTS OPEN.

HALSTON, ONT.—A new school house will be erected at this place.

STAPLES, ONT. Funds are being raised to build a Methodist church.

FULLER, ONT.—The Presbyterian congregation will build a church here.

NORWOOD, ONT.—The foundation of J. B. Pearce's block has been completed.

MITCHELL, ONT.—The corner stone of the new Trinity church was laid last week.

TILBURY, ONT.—Subscriptions are being solicited for building a Presbyterian manse.

HAILEYBURY, ONT.—Work has been commenced on the new Presbyterian church.

THORNBUARY, ONT.—H. Isaacs and M. J. Reynolds purpose erecting an hotel at Steep Rock.

MONCTON, N. B.—The sum of \$15,000 will probably be voted for the construction of new sidewalks.

HULL, QUE.—The city council has under consideration the question of extending the waterworks system.

COLLINGWOOD, ONT.—J. Coleman, of the Ceylon Tea Company, will build a brick store two stories in height.

PEMBROKE, ONT.—The town has granted \$20,000 towards the building of a railway from Pembroke to Golden Lake.

LONDON, ONT. McBride & Farncombe, architects, invite tenders this week for the erection of a brick store on King street.

WINDSOR, ONT.—Steven Lustard, city clerk, will receive proposals until August 2nd for the purchase of \$67,024 of debentures.

RENFREW, ONT.—Tenders will be received by George Eady, jr., until the 13th inst., for ventilating the new Ward school,

the heating to be hot air with coal furnaces.

LINDSAY, ONT.—The purchase of a road roller has been referred to the Board of Works and Finance Committee, with power to act.

BELLEVILLE, ONT.—D. B. Robertson, city clerk, asks tenders until to-day (Thursday), for constructing a sewer on William street.

GALT, ONT.—The Agricultural Hall Committee will shortly invite tenders for a proposed building. Mr. Douglas is president of the society.

ORILLIA, ONT.—The bridge between Tay and Baxter was carried away by a recent flood, and a new structure will probably be erected.

MAGOG, QUE.—By-laws have been carried authorizing the borrowing of \$10,000 for electric lighting and \$13,000 to consolidate the municipal debt.

CHATHAM, ONT.—Powell & Carswell, architects, will receive tenders until July 15th for the erection of a frame coopeage shop to be built on Queen street.

VANCOUVER, B. C.—The promoters of the proposed smelter have made a proposition to the city to erect the building at Seymour creek, North Vancouver.

TILBURY NORTH, ONT.—William Newman, C.E., invites tenders for \$11,000 worth of ditching in Tilbury North and Tilbury West.—The council wants offers for \$24,720.90 of drainage debentures.

ST. HYACINTHE, QUE.—The city has appropriated \$30,000 for improving the waterworks system. A new pumping station will be built up the river, and a high duty pump of 2,000,000 gallons capacity per 24 hours put in.

SHERBROOKE, QUE.—The council have decided to construct a waterworks system. A strip of land has been granted to C. H. Nutter, on which he will erect an opera house, to cost \$20,000, and a business block, to cost \$30,000.

MACLEOD, N. W. T. M. J. Haney, manager of construction, asks tenders up to July 12th for the grading of the first 50 miles of the Crow's Nest Pass Railway, and up to July 15th, for the second 50 miles west of Lethbridge.

STRATFORD, ONT.—The Perth Flax & Cordage Company will erect a brick cordage factory and a frame flax mill. The former building, for which plans have been prepared, will be 36 x 114 feet, with a one-story engine house.

BRANDON, MAN.—The Western Agricultural and Arts Association is constructing a new half-mile race track, grand stand and horse stables, and making other improvements. W. H. Shillinglaw, city engineer, has charge of the work.

NIAGARA FALLS, ONT.—A syndicate including Messrs. T. G. Blackstock, J. W. Langmuir, W. B. Rankine, W. C. Ely, Alexander Fraser and J. M. Bostwick, have laid before the Ontario Premier a

project to construct another bridge across the Niagara river near Lewiston, with an electric belt line railway, taking in the loop formed by the two bridges along both sides of the river.

BARRIE, ONT.—The county council invites tenders for a suitable site for a House of Refuge.

INGERSOLL, ONT.—The Government is said to have purchased a site for the new post-office and custom-house building.

BROCKVILLE, ONT.—Tenders for plumbing, masonry, carpenter work and drains in connection with the alterations in the East Waid school will be received by John Menish, Box 129, until the 10th inst.

RAT PORTAGE, ONT.—The C. T. & E. Co. will erect a commodious office building.—Sewers will be constructed on Main, Fort and Second sts.—Councillor Currie has given notice that he will introduce a by-law in council to raise funds to construct a waterworks system.

GUELPH, ONT.—J. Hutcheon, C.E., invites tenders until to-day (Thursday) for building masonry abutments for a bridge over the Grand river at Belwood, West Carafraux.—C. R. Bruce, architect, asks tenders until the 9th inst. for the erection of two dwelling houses for John McAtter.

WOODSTOCK, ONT.—The city council has given notice of its intention to construct a number of silica barytic or granolithic sidewalks.—A site has been selected for the proposed fire-hall and market, and work thereon will shortly be commenced.

ST. JOHN, N. B.—Tenders for earth and rock excavations, pile driving and masonry at the western approach to the cantilever bridge are asked until Saturday, 10th inst. Address, T. B. Robinson, secretary St. John Bridge & Railway Extension Company.

COBOURG, ONT.—Tenders are asked up to noon of July 13th, for masonry sub-structure and additions to iron superstructure of a bridge at Campbellford. Plans may be seen at the offices of Neil Mac-Nachtan, counties' clerk, or the county engineer, H. T. Hazen, this town.

ST. LAMBERT, QUE.—The municipality has given a twenty-five years' franchise for systems of waterworks and sewerage to the Drummond McCall Company. The work will cost about \$100,000, and will be commenced as soon as the by-law has been ratified by the Lieutenant-Governor.

KINGSTON, ONT.—The Board of Trade will ask the city council to submit a by-law to the electors granting a bonus to the Montreal Transportation Company for building a grain elevator here. Plans will be prepared by the Barnett & Record Company, architects, of Chicago, for the grain elevator to be erected by Messrs. Mooers. Work will be commenced at an early date.

QUEBEC, QUE.—D. Ouellet, architect, has prepared plans for a large wharf at Bais des Chaleurs, 450 feet long, with five gates, for the Ostrecoite Company, estimated cost, \$3,500.—Building permits have been granted as follows. Repairs of Elzear Cote's house on Charest street, Jos. Villeneuve, contractor. Repairs of a house on St. Paul street for Miss Starkey; contractor, G. Brousseau. Foundations to be renewed at M. Boutin's house, contractor, A. Vezina.

HAMILTON, ONT.—T. Reasley, city clerk, will receive proposals until the 15th inst. for the erection of a wing at the city hospital. Plans at the office of W. W. Lachance, architect.—The city engineer will probably visit Rockingham, Mass., to inspect sewerage disposal works there before preparing plans for the Ferguson avenue sewer.—E. B. Patterson has been granted a building permit for a two-story

brick dwelling on Wentworth street, for H. Sherk, to cost \$1,250.—It is said that the Osler syndicate will make an amended proposition to the city council for the taking over of the Hamilton & Dundas and Hamilton street railways.

WINNIPEG, MAN.—In addition to the large number of pavements being constructed this year, the city will next season undertake the construction of pavements on other streets.—Plans are being prepared for the new Main street overhead bridge across the C. P. R. at Salter street, and for alterations to the Osborne street bridge.—Plans are being prepared for the provincial bacteriological laboratory.—It has been decided to make an addition to the Children's Home, at a cost of \$1,800.

MONTREAL, QUE.—Tenders for a steam fire engine are asked by L. O. David, city clerk, until noon to-day (Thursday).—Mr. Shaughnessy, vice-president of the C.P.R., states that his company will probably have some 600 miles of subsidiary lines of railway in operation in the mining regions of British Columbia in 1898.—Robert Findlay, architect, is preparing plans for a residence on Dorchester street, Westmount, for Henry Fry. Tenders will be invited in a few days.—Jos. Venne is calling for tenders for a large flight of steps, with modifications, to be built at St. Vincent de Paul church, Montreal.

NELSON, B. C.—The West Kootenay Power & Light Company are receiving tenders for the excavation and removal of about 20,000 cubic yards of rock work on their power house site at Middle Falls. Particulars may be obtained from J. G. Kellett, C.E.—The corporation have invited plans and specifications of systems of waterworks and sewerage, for which the sum of \$500 was offered for the accepted design. C. E. Sealey, city clerk.—The city engineer has been instructed to prepare plans and invite tenders for a lock-up, stone, 30 x 30 feet, and two stories high.—Ground has been broken for a brick block to be erected by Mara & Barnard, two stories, fitted up for office purposes.

OTTAWA, ONT.—Tenders for new fire stations will be called for at once. Station No. 9 will be built on Jane street and No. 5 in the vicinity of King street, from plans by J. F. Alexander, architect. They will be 66 x 31 feet, exclusive of tower. The plans for the central station were prepared by M. C. Edey, architect, and show a building 53 x 63 feet, with stable in rear 22 x 64 feet. On the ground floor there will be six rooms and a hall and in the upper storey a gymnasium 50 x 66 feet. The tower will be 125 feet high.—The Dominion parliament has granted incorporation to the Southern Counties Railway, which will extend from St. Lambert to Chambly, St. Johns and other towns in the eastern townships. Mr. A. J. Coriveau, of Montreal, is one of the promoters.—Mr. H. J. Beamer is said to have completed arrangements for the immediate construction of the interprovincial bridge to connect Hull and Ottawa, towards which the Dominion government recently granted a bonus of \$115,000. The structure will cost probably \$1,000,000.—The R. C. Archbishop's palace on St. Patrick street is to be enlarged and improved, at a cost of \$20,000. An addition 40 feet deep will be built on St. Patrick street, and an additional storey added to the present structure, while the whole of the interior will be renovated. It is also stated that Canon Bouillion has prepared plans for improving the front of the Basilica.—Tenders for the new St. Luke's Hospital will likely be asked this week. The building will be 164 feet long, three storeys, mansard roof, brick, with lime-stone trimmings, with tower 85 feet high. Each of the wings will be provided with fire escapes.—The public works department will spend \$200,000 during the fiscal year in deepening the channel of the St. Law-

rence river between Montreal and Quebec. The engineers estimate that another \$300,000 will be required before the work is completed.

TORONTO, ONT.—Berkeley street rate-payers have petitioned against an asphalt pavement.—The city engineer has recommended the construction of the following works: Dufferin street, Peel avenue to Dundas street, gravel roadway, cost \$3,830; Pembroke street, Shuter to Gerrard streets, macadam roadway, cost \$8,400; Arthur street, Bathurst street to the bridge, cedar block pavement, cost \$7,500; Isabella street, Church to Jarvis streets, both sides, cement concrete sidewalk, cost \$1,260; Front street, opposite Nos. 10, 12, 14 and 16, cement concrete sidewalk, cost \$246. Brick pavements are also recommended on Queen street, from the river Don to Pape avenue, and on Spadina avenue, from Queen street to College street, at a cost of \$6,700 and \$5,100 respectively.—C. J. Gibson, architect, is taking tenders this week for a brick residence on South Drive, Rosedale; hot air heating.—The Department of Public Works wants tenders before noon of the 10th inst., for under-drainage, joisting and flooring required at the Asylum for Insane, London. Address, William Harty, Commissioner of Public Works.—The Street Railway Company have acquired property at the south-east corner of King and River streets, on which an addition to the present brick sheds will be erected.—The city engineer has recommended that a gravel roadway be constructed on Garden avenue, between Sorauren and Roncesvalles avenues, and a cedar block pavement on Queen street, between Yonge street and Gladstone avenue.—Building permits have been granted as follows: Wm. Harris, 420 Pape ave., 2-story bk. abattoir, e. side Strachan ave., near cattle market, cost \$8,000; W. Jones, 2-story and attic bk. dwelling, 129 Brunswick ave., cost \$2,000; C. Fellows, 2-story s. d. bk. dwelling, s. side Sussex ave., near Spadina, cost \$3,000; A. Haskell, 2 det. 2-story and attic bk. dwellings, 17 Gerrard st. e., cost \$2,300; Mark Tippling, mansard roof and 2-story bk. add. to dwelling, n. side Alice st., near Yonge, cost \$2,000; Toronto Railway Co., bk. and iron car shed, cor. Howard ave. and Dundas st., cost \$8,000, and bk. add. to car stables, King st. e., cost \$2,000.

FIRES.

Harriman's planing mill on Simcoe street, Niagara Falls, Ont., was damaged by fire last week to the extent of \$800.—Fire at the stove and heading works of W. H. Matthews & Co., Trenton, Ont., completely destroyed the mill and dry kiln, at a loss of \$9,000. Mr. Matthews will rebuild immediately.—The residence of Henry Mann, at Baillie, N. B., has been burned; insurance, \$1,500.—The general store of A. & H. Foreman, at Collingwood, Ont., was burned on July 1st; loss, \$10,000, partially covered by insurance.—A large three-story boarding house at Depot Harbor, owned by J. R. Booth, of Ottawa, was recently consumed by fire.—Fender-son & Company's lumber mills at Sayabec, Que., were burned a few days ago. Loss, \$50,000; insurance, \$8,000.—The saw mill of Messrs. McKay, of the tenth concession of Tuckersmith, Port Finlay, Algoma, was recently destroyed by fire.—The residence of John Steacy, Warburton, township of Lansdowne, Ont., was destroyed by fire on Wednesday of last week; loss \$5,000.—At Jonquieres, Que., a church was recently burned.—Two houses in St. Laurent village, Que., were burned a few days ago; loss \$7,000.—Fire at Hastings, Ont., on the 5th inst., destroyed John Kelly's carriage shop and dwelling house, W. T. Tait's cabinet shop and dwelling, Mrs. Orr's residence, the town hall and Presbyterian church.

CONTRACTS AWARDED.

RENFREW, ONT.—\$72,000 of bonds have been sold to the Bank of Ottawa.

COBOURG, ONT.—Martin Jex & Son have been awarded the contract for a large summer hotel for Alfred Harris.

LINDSAY, ONT.—Bruce McBurney has been given the contract for an electric fire alarm system, at the price of \$525.

MONCTON, N. B.—The contract for erecting a new parsonage for Rev. W. B. Hinson has been awarded to W. S. Steadman.

CALTON, ONT.—The Central Bridge & Engineering Company, of Peterboro, have secured the contract for a bridge across the Ottawa River, at \$1,483.

FREDERICTON, N.B.—A satisfactory test of the road plant recently purchased from the F. C. Austin Manufacturing Company, of Chicago, was made in this city a few days ago.

OTTAWA, ONT.—The contract for the extension of the Archbishop's palace has been let to Andre Charlebois, of the city, his tender being \$10,577. S. Z. Gauthier, of Montreal, architect.

LONDON, ONT.—The contract for section "K" of the sewerage system has been awarded to Oakley & Holmes, of Toronto, at \$14,750. W. F. Grant & Company, Toronto, tendered at \$17,645.

STRATFORD, ONT.—Contracts have been let by T. J. Hepburn, architect, for a cordage factory, as follows: Masonry, W. Filey; carpentry, B. F. Youngs; galvanized iron work, A. Brandenburger.

MONTREAL, QUE.—A. Dubreuil, architect, has awarded contracts for tenements to be erected at the corner of Cadieux and St. Agathe street, for M. Adolphe Mathien, to Henri Pepin & Co., for all trades.—The bricklaying work of Hon. L. Tourville's four residences, to be erected on Cherrier street, has been awarded to E. Paquette. Chas. Chausse, architect.

LEVIS, QUE.—Paquet & Fortun, of this town, have recently been awarded the following contracts: Branch railway, 1½ miles in length, for the Laurentide Pulp Company; branch of the Great Northern Railway, 10 miles; bridge over the Shawenegan River; 3 miles of railway to Coulee Lavargue; steel bridge over a branch of the Shawenegan River.

TORONTO, ONT.—Darling & Pearson, architects, have accepted the following tenders in connection with the new building at the corner of King and Yonge streets: Masonry, Cannon & Son; carpentry, Alex. Clark & Son; terra cotta, Raibun Co.; plastering, J. M. Gander; iron work, St. Lawrence Foundry Co.—The contract for the new school in East Toronto has been awarded to McMillan & Costain, local contractors, at the price of \$6,214, exclusive of heating. J. A. Ellis, architect.

BUSINESS NOTES.

Sampson Bros., brick manufacturers, Brandon, Man., have dissolved partnership, John Sampson continuing.

Tenders are asked by W. G. E. Boyd, trustee, for the purchase of the assets of the Beamsville Pressed Brick Company, of Beamsville, Ont.

The Brantford Machine & Tool Company has been organized, with a capital of \$150,000. They will manufacture machinery, tools castings, etc.

The Ontario Sewer Pipe Company, of Mimico, purpose erecting two new brick kilns, and will increase their staff of employees largely to meet the demands of their trade.

The Windsor Specialty Manufacturing Company has been formed at Windsor, Ont., with a capital of \$10,000. Directors: Wm. McGregor, George Bartlett, James A. Smith, and others.

PLANS FOR A GOVERNMENT BUILDING.

The Mexican Government has, through its Consul General, Mr. D. A. Ansell, invited competitive plans for new legislative buildings, estimated to cost about \$2,000,000. The competition is open to all Canadian architects, and general specifications, printed in French, have been received by Mr. Ansell and can be consulted at his office in Montreal.

ROOFING TILES.

Most of the names applied to tiles are derived from or suggested by the various shapes which are made. Plain or crown tiles are such as have a rectangular form and plane surface. In England a statute provides that they shall be 10½ in. long, 6¼ in. broad, and ½ in. thick, and are manufactured with two holes in them, through which, by means of oak pins, they hang upon the laths. In use one tile laps over another, or is placed over the upper part of the one immediately below. That part of the tile which then appears uncovered is called the gauge of the tiling. The so-called Italian tiles differ somewhat from these, as, instead of being flat, they are slightly curved, fit easily one into the other, with a horizontal indentation across the upper part to prevent the wind drifting the rain over the tile head. They have either wide or narrow vertical rolls.

White glazed tiles are used for lining the walls where reflected light is needed.

Three courses of plain tiles laid in cement and well bonded have been for many years employed for slightly curved roofs,

to form terraces, roofs for cellars under paving, as roofs over small back buildings, and for similar purposes. It has been asserted that the tiles should not be covered with cement. Portland or other cement laid on brick arches, or on tile, or on a flat concrete roof, supported by iron joists, also asphalted roofs, all generally crack and let in wet, especially when there is any traffic on them, or their foundations are not perfectly stable. In England tarred roofing is formed of plain tiles in three courses, rendered on the top to the thickness in all of about 4 in., carried over by arches slightly cambered, springing from small brick piers, and tied by light iron rods, which form their chord line. These flats have an immense weight upon them, and are cast in one piece, as it were, there being no perceptible joint; they are completely water tight and can be easily cleaned.

Plain tiles are laid on different gauges; 210 plain tiles, laid flat, covering a square of tiling. Pan tiles are generally pointed in mortar, which, if it be not very strong, will not stick; in consequence of this the roofs require fresh pointing every few years, especially in exposed situations. Many tilers have a practice, when plain tiles are set in mortar, not to peg more than one hole in ten. This is a bad practice, as with the decay of the mortar the tile will slip down. In some parts of the country the ancient custom prevails to bed the tile in hay or moss, and when the roof is of the full pitch this suffices without mortar. They may even then be laid dry. But with any less pitch some

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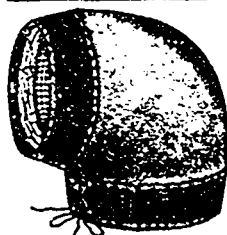
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THE PROTESTANT INSANE ASYLUM, Verdun, near Montreal.
THE GRAND HOTEL, St. Hyacinthe, Que.
THE NEW CUSTOMS-APPRAISERS STORES, NEW YORK, now building, which will consume 5,000 tons.
THE PARLIAMENT BUILDINGS, OTTAWA, portion of which was recently destroyed by fire and rebuilt.

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precaution must be used to keep out the drifting snow and such wet as may be blown up between the tiles, lifted by the force of the wind. In lieu of oak pegs, extra large flat-headed wrought nails, made of pure zinc or of zinc and copper, have been used, and it has the advantage of allowing a tile to be replaced from the inside of the roof, by lifting up the others to place in the tile and drop in the nails in a few seconds.

Pan tiling is laid to a 10-in. gauge, and 180 pan tiles will cover a square.

Glass tiles have been used on roofs where a modicum of light is required.

Tiling is measured by the square of 100 superficial feet; a square will require 800 at a 6in. gauge, 700 at a 7in. gauge, and 600 at an 8in. The gauge necessarily regulates the distances of the laths, and at the same time must be dependent on the slope of the roof, which, if flat, should not be less than 6in., as, for instance, above the curb in a curb roof, and not more than 8in. in any case. A square of plain tiling requires about on an average a bundle of laths, two bushels of lime and five of sand and at least a peck of oak pins. A bundle of laths 3ft. long contains 160; 4 ft., 120; and 5 feet, 100. The nails used are fourpenny. A square of pan tiling requires 180 tiles laid at a 10in. gauge.

USEFUL HINTS.

TO CLEAN PAINTED WALLS.—A simple method given in the Pharmaceutical Era is to put a little aqua ammonia in moderately hot water, dampen a flannel with it, and gently wipe over the painted surface. No scrubbing is necessary.

TO CLEAN WALL PAPER.—Place a cotton cloth over a broom, and sweep down the wall to remove any dirt or dust. Take a stale loaf of bread, cut off the crust at one end, and wipe the paper with the square end. Do not work the bread backwards and forwards, but draw regular strokes in one direction only. When the loaf is dirty, cut off a thin slice and proceed as before. Another plan is to use bran, which is best applied by a large sponge. Place a cloth on the floor to catch the bran as it falls, and do not use the same bran twice. To remove grease

spots use a hot flat iron, placed against a piece of blotting paper held against the spot, and repeat several times until the grease spot disappears.

RECIPES FOR WOOD FILLERS.—Following is a recipe for fillers offered by the Scientific American: Hard wood filler.—Use boiled oil and enough corn starch to make a very thick paste. Add a little japan and reduce with turpentine. Add no color for white oak; for dark ash and chestnut, use a little raw sienna; for walnut, burnt umber and a very little Venetian red; for bay wood, burnt sienna. Use enough color to cover the white of the starch. Apply with brush and rags. Let it dry for forty-eight hours, or until it is in condition to rub down with No. 0 sandpaper without much gumming up, and if extra fine finish is required, fill again with the same materials, using less oil, but more of japan and turpentine. The second coat will not shrink, being supported by the first coat. When the

second coat is hard, the wood is ready for finishing in any desired style or to any degree of nicety by following up the usual methods. This formula is not intended for rosewood and will not be satisfactory if used therefor.

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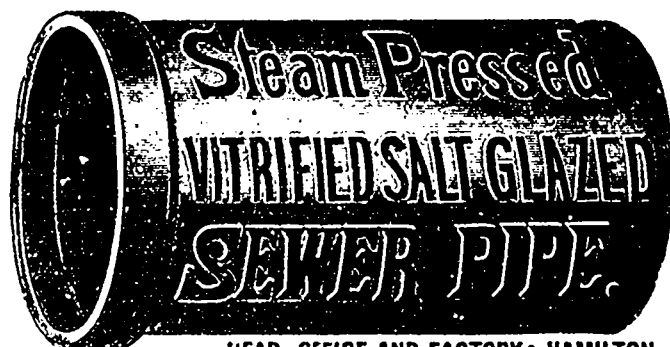
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STEAM ROAD-ROLLING.

The following is a report on steam rolling by Mr. W. F. Y. Molineux, C.E., district surveyor, to the members of the New Winchester Rural District Council, and is taken from the Contract Journal, of London, Eng.:

The advance of civilization and science has decided that road-rolling is a necessity for macadamized roads, instead of allowing the stones of which they are composed to be worn in by the ordinary traffic. The demand on all the best quarries for trap rock and basalts is exceedingly heavy, and it has been shown to surveyors and engineers the necessity of bringing to a minimum the waste of materials. Again, in relation to field stones, such as are picked from the land in various counties, the supply shows a decline, owing largely to agricultural depression. A large area of land is being put down to permanent grass, and therefore land heretofore yielding large quantities of materials at a cheap rate will not in future produce any. In this particular district I can see a large portion of the land being laid down, and in all probability in a few years' time the price of flints will have to be increased, owing to their scarcity and the extra cartage which will necessarily follow.

Our contract with the County Council this year is to purchase and spread upon the main roads 4,570 cube yards; besides this, we shall in all probability spread 6,000 to 7,000 cube yards upon the district roads. Looking at the return of the County Council for this year, I find there are 510 miles of rural main roads in the county. These, with an average of 70 cube yards of materials per mile per annum, mean an output of 35,700 cube yards (mostly field-picked flints). Whether this is a large drain on the land is for you to decide.

Now, in regard to steam rolling, it may be interesting to know the origin of rolling. In Calcutta bullock rollers were used as long ago as 1855, and it was the cruelty of this operation that suggested to Mr. W. Clarke the necessity of a steam-roller, the outcome of which was the well-known roller as manufactured by Messrs. Aveling & Porter, of Rochester. The first steam-roller was made and used in 1864, and was used in Paris.

Steam rolling saves money as well as suffering, and the legislature have recognized the importance of a sanitary authority becoming possessed of a steam-roller by permitting money to be borrowed for the purchase of a roller as for a permanent work. See page 234, Glen's "Public Health Act," 1875, footnote to sub-section (1). The advantages of a steam-roller are briefly as follows: (1) the saving of materials equal to 30 per cent., (2) less cost in breaking materials, (3) saving in wear

and tear to vehicles and horses, (4) economy in less frequent scraping; (5) the prevention of cruelty to horses, cattle and sheep, as in the case of newly-metalled roads; (6) the avoidance of men continually raking loose stones into the ruts; (7) the consolidation of roads which have very light traffic—such as the Winchester, Morestead, and Bishop's Waltham road where materials, after being spread, lie upon the surface for two years in a loose condition, causing grass to grow in the metal; (8) the traffic is more evenly distributed over the surface of the road; (9) the facility of restoring a road that is bad in cross-section, but sufficiently strong in materials; (10) the restoration of roads after frost.

The disadvantages are: (1) the liability for any damage to drains or water mains, (2) extra cost during the first three years; (3) the moving about of the roller from parish to parish, and the difficulty on the part of the surveyor to give satisfaction to all the councillors, many of whom may want the roller at one and the same time, and each believing his particular district has a prior claim. This district, as you are aware, is 18½ miles from north to south and 14 miles from east to west; (4) in some parts of the district the scarcity of water; (5) the necessity of so much binding material and water.

In dealing with the cost of steam rolling, my experience in Shropshire with a 15-ton and a 10-ton roller is that a fair average cost of working a 10-ton roller, including wear and tear, is equal to £7 16s. per week, or £1 6s. per day, this expenditure being made up as follows:

Wages of driver per week.....	£1 10 0
“ “ two sweepers	1 4 0
Cartage of binding material	1 0 0
“ “ water	2 2 0
Coal, oil and packing	1 0 0
Depreciation and repairs, estimated at 10 per cent. per annum	1 0 0
	£7 16 0

A fair average quantity of materials properly consolidated per day with a 10-ton roller is 35 cube yards, which works out at a cost of 9d. per cube yard. Now, assuming that the opinion of a large number of surveyors is correct in stating that 30 to 50 per cent. is saved in materials by rolling, the inference is this:

	s.	d.
Present system.		
First cost of material, per cube yard	4	0
Loss by abrasion and crushing at 25% ...	1	0
Breaking to 2-inch gauge	0	10
		5 10

	s.	d.
Rolling system.		
First cost of material, per cube yard	4	0
Rolling	0	9
Binding and watering	0	3
Breaking	0	8
		5 8

Although these figures show a less cost in rolling, nevertheless, if you adopt a system of steam rolling in your district, you must be prepared to pay a trifle higher rate per mile for about three years, but do not lose sight of the fact that the roads would be in a more substantial state and compare more favorably with other counties.

The rural main roads in Staffordshire cost £79 per mile, those in Shropshire cost £45 per mile; while in this district our contract is £27 per mile, our district roads costing £13. 13s. per mile. On looking into the return of the County Council, I find that the Winchester Town Council were allowed an expenditure of £761 for 457 miles, which works out at £169 per mile (this is exclusive of footpaths).

The roller suitable for this district would be one of 10 tons, and the cost would be about £300 for cash, or £320 if paid in instalments in three years. A water-cart and a sleeping-van would also be required. The water-cart, holding 180 gallons, with pump, hose, and spreader, would cost £20, and a sleeping-van, with accommodation for three men and a bunker holding 18cwt. to 20cwt. of coal, would cost about £60. The necessity for a sleeping van is apparent, as some parts of the district are so isolated, and it is necessary for the driver to be in attendance on his engine at 5.30 a.m. Further, it avoids the engine being left without anyone in charge.

I submit a table showing the comparative bearing weights of various-sized wagons and steam-rollers upon a road.

I fear, gentlemen, to trespass further upon your time. The figures I have given you and the remarks I have made have been based upon the fairest lines, and it now remains with you to discuss the matter in a business light, and to decide whether in your opinion this district is suitable or in need of a steam-roller.

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Aveling & Porter's 15-ton road-roller. Total bearing width, 90 in. Weight per inch on road, 373.7 lb.
A South-Eastern Railway Company's wagon, built to carry four tons; tyres, 24 1-2 in. wide; weight, 1 ton 5 cwt. 2,800 lb. Weight of wagons and load per inch on road, 1,306.0 lb.
A Pickford spring wagon to carry two tons. Weight, 1 ton 1 cwt. = 2,352 lb. Tyres, 2 in. wide = 294 + 560. Total bearing per inch, 854.0 lb.
A Pickford spring wagon to carry three tons. Weight, 1 ton 7 cwt. 2 qr. = 3,080 lb. Tyres, 2 1-2 in. wide = 308 + 3 tons = 672. Total bearing per inch, 980 lb.

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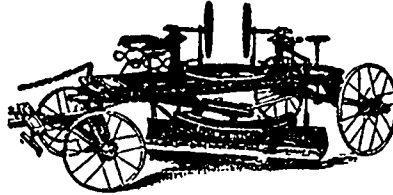
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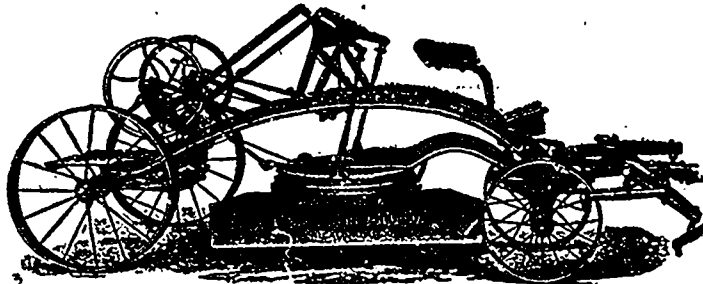
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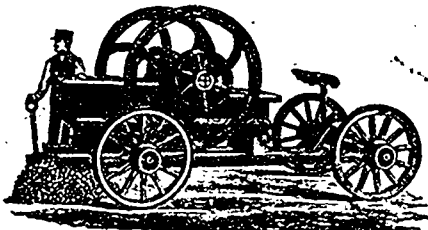
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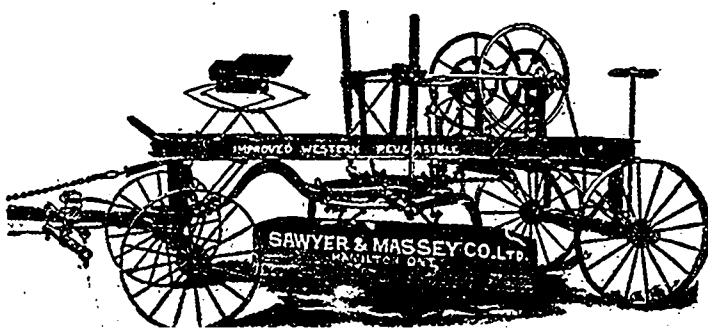


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