

sidewalks, wooden sidewalks, sewers, etc.—The tenders for the proposed contagious disease hospital have been found to be too high. The architect has consequently modified the plans and new tenders are asked for, to be sent in by 4 o'clock to-day (Thursday).—At the last meeting of the Trades and Labour Council a resolution was passed asking the Government to provide a site on which to erect a new building, and a committee was appointed to further the scheme.—The Alberta Southern Railway Company is applying for incorporation to construct a railway from Calgary to Lethbridge, and thence to the international boundary.—The sum of \$1,250 has been collected for the purpose of placing new heating apparatus in St. Paul's Presbyterian church.

MONTREAL, QUE.—The Finance Committee has granted the sum of \$10,000 to grade Cedar avenue.—The Electric Railway Committee of the City Council has reported in favor of granting the Belt Line Railway Company permission to erect an elevated road on Delorimier avenue, Ontario, St. Catharine, Craig and St. James Sts. The company are to commence work before June 1, 1894.—The Montreal Water and Power Company intend to erect a large electric power house at Perry's Island, and to construct a water main from Sault-Aux-Recollets to a large supply reservoir at Outremont.—The Harbor Commissioners are making arrangements to build a new pier next season at section 43, below the Hudon cotton factory.—It is announced that the C. P. R. intend to extend the Montreal and Ottawa railway into this city, at an early date.—The Finance Committee has decided to recommend to the City Council the submitting a bonus to the ratepayers granting the sum of \$100,000 to the proposed interprovincial traffic and railway bridge across the Ottawa river.

TORONTO, ONT.—Wm. J. Brown, 39 Adelaide street east, is desirous of securing a building lot between Spadina avenue, Euclid avenue, Queen and College streets.—Liberal subscriptions have been received towards the erection of the proposed University College Women's residence.—At a meeting of the Consumers' Gas Company held a few days ago, the President, Mr. James Austin, was empowered to purchase a lot on the Island with a view to erecting gas works there in the spring, provided the city decides to extend the lease of the lots to residences.—At a meeting of the Board of Works held on Monday last, the recommendations of the City Engineer for the paving of Broadview avenue, Bathurst street and Dundas street were sent on to Council. The board ordered that a level crossing, to cost \$2,500, without gates, be opened up at Lansdowne avenue. Mr. Keatings report on the source of water supply was left over for a special meeting. After discussing the question of constructing the proposed wharf at the foot of Yonge street at once, it was decided to leave the matter in the hands of the Property Committee to take action at an early date. The City Engineer recommended that the wooden pipe from the shore crib to the bell buoy be replaced by a steel one.—Building permits have been granted as follows: Mrs. M. Rogers, pr. s. d. 2 story and attic bk. dwellings, e. side Jameson ave., cost \$5,400; F. H. Herbert, architect, pr., det. 2 story and attic bk. and stone dwellings, e. side Walmer Rd., nr. Bloor st., cost \$18,000; Wm. Murray, 34 Wright ave., two det., 2 story and attic bk. dwellings, 103 Jameson ave., cost \$6,000; A. Nelson, 406 Manning ave., pr. s. d. 2 story and attic bk. dwellings, 69 and 71 Madison ave., cost \$10,000.

FIRES.

The residence of H. Stevens at Peterborough, Ont., was destroyed by fire last week. Loss, \$1,600; insurance \$1,100.—The saw mill of Messrs. Davidson & Davidson, at Cape Chien, Georgian Bay, was burned to the ground on the 26th ultimo. Loss, \$4,000; no insurance.—

The tannery and storehouse of C. Deguise, valued at from \$10,000 to \$12,000, was destroyed by fire recently at Ste. Genevieve de Batiscan, Que.—A large brick residence owned and occupied by Mr. Thomas Walker and situated about two miles from Port Elgin, Ont., was destroyed by fire on Thursday of last week. Loss \$2,000.—Fire at Ashburnham, Ont., on the 25th ultimo, destroyed the Maple Leaf hotel, owned by George Lipsitt, a cooper shop owned by Mrs. McGregor and the residence of Stuart Wright.—The Georgian bay box factory and planing mills at Midland, Ont., were burned recently. Loss on building and machinery, \$12,000; insurance \$6,000; drying kiln, \$2,500; insurance \$1,500. The company purpose rebuilding at once.—The old Westbrook hotel at Cainsville, Ont., owned by E. H. Welling, of Brantford, was burned on Tuesday last. Insurance \$800.

CONTRACTS AWARDED.

BEEOTN, ONT.—A syndicate is being formed here to erect a block of stores.

COLLINGWOOD, ONT.—Improvements are to be made in the Maple street Methodist church here, costing about \$8,000.

KINGSTON, ONT.—The Kingston and Montreal Forwarding Company have been awarded the contract to make the necessary repairs to the Ogdensburg steamer Hecla. The repairs will cost over \$10,000.

HAMILTON, ONT.—The Sewers Committee has accepted the tender of J. J. Armstrong for a sewer on Milton avenue, at 49 cents per foot, and that of G. F. Cooper for a sewer on Brant avenue, at \$1.05 per foot.

TORONTO, ONT.—Mr. Geo. F. Bostwick has been awarded the contract for interior fittings, including counters shelving, show cases, office fittings, etc., required in the new store of Messrs. Michie & Co. now being erected on King street west.

OTTAWA, ONT.—Mr. Bourque, contractor, of Hull, has signed a contract with the authorities of the University of Ottawa for the construction of a large building at the corner of Theodore and Cumberland streets to be used as a juniorate. The contract price is \$30,000.

GALT, ONT.—Mr. W. Hallman has secured the contract for the erection of four brick dwellings in the Gilholm survey for Dr. Lowery. The figure is in the neighborhood of \$1,500 for each house. He will also build three houses in the spring for Mr. Aaron Ross, costing \$2,600 each.

CARTAGE OF EXCAVATED MATERIAL.

In excavations a contractor occasionally has the good fortune to strike upon a bed of sand or gravel which was not anticipated, and it rarely happens that he is not allowed to enjoy the whole advantage of the material. A case has occurred in Glasgow, and has given rise to litigation, which presents a rather novel claim that was founded on discovery. Mr. John Young obtained a contract for a section of the works on the Glasgow Central Railway, and in August 1890 he agreed with a firm of cartage contractors, named Young & Co., to carry materials from the cuttings to a spoil-bank at the rate of 5s. per ton. Sand was found in 1891, and was sold by Mr. Young to builders, who removed it at their own expense and in their own carts. His cartage contractors claimed the monopoly of removing their stuff, but it was not allowed. In September 1891 a deep bed of sand was reached, and again the question arose whether Mr. Young was entitled to sell or store the sand without being bound to give Messrs. Young the cartage of it. They reasserted their claim to "the cartage of everything excavated." Mr. Young, while denying their right to this, proposed that they should cart all the sand that was intended for the store on time-payment, and when they refused they ordered off their carts and employed other carters. Messrs. Young thereupon brought an action for

breach of contract, and claimed 1,500/ damages. Their agreement "to do the cartage of gravel, sand, &c., of the cutting of the new railway," it was maintained, gave them a right to remove all material excavated. The Court decided against the carters. On appeal the judgment was upheld. It was laid down that there was nothing in the contract giving the plaintiffs right to the cartage of everything excavated, the contract rather being that they were to have the carting of what required to be carted, and that the defendant was the judge of the quantity. Scotch law does not correspond with what is followed in England. An English Judge would be likely to arrive at an opposite decision. Apparently the intention of the parties was that the carters were to remove all the stuff from the cuttings, and if the sand, gravel, &c., caused extra inconvenience, the carters would have to take the risk. The discovery of the valuable beds of sand made the cartage unnecessary, for the purchasers used their own carts. But how could a general agreement be affected by their contingency that was not referred in any way?

MUNICIPAL DEPARTMENT.

PROPER METHOD OF TESTING PUMPING ENGINES.

The American Society of Mechanical Engineers' committee, on "a standard method of conducting duty trials of pumping engines," has recommended that the duty be expressed in foot pounds of work per 1,000,000 British thermal units. The duty so expressed is equivalent to that per 100 pounds of coal if each pound of coal gives 10,000 B. T. U. to the steam. This is a fair value of coal under good working conditions, so that the new basis does not differ widely from the old in usual cases, and is a much fairer standard. Or, as stated in the report of the above-mentioned committee, "The proposed new unit is thus, in reality, though not in name, in close accord with the existing unit, and, furthermore, it retains its numerical simplicity."

$$\text{Duty} = \frac{\text{Foot pounds of work done}}{\text{Pounds of coal burned}} \times 100.$$

With the proposed unit:

$$\text{Duty} = \frac{\text{Foot pounds of work done}}{\text{Total number of heat units supplied} \times 1,000,000}.$$

The difficulty of determining the number of heat units supplied is no greater than that met in determining the quantity of steam used, providing the steam is corrected for entrained moisture or superheat; and this should always be done. In fact the quantity of heat is derived directly from the same observations.

The heat supplied is equal to the quantity of steam times its total heat (the proper correction being made for the quality of the steam). The total heat of steam of the pressure and quality used is found from the steam tables.

All steam used in operating the plant, including that used in the steam cylinders of the pumping engine, jackets, for air and circulating pumps, and for boiler-feeding device, pumps or injectors, is to be included.

As to the means of measuring the work done by the pump several methods are possible.

In engines of large capacity a direct measurement of the water delivered is usually impracticable; but this quantity may be determined more or less closely, by the use of a weir, or standard orifice, or nozzle, in case the pump delivers into a reservoir, or if the water can be run to waste during the trial; by means of an orifice or what is known as the Venturi tube, inserted in the delivery pipe; or by measuring the displacement of the plungers. Each of these methods has its own sources of error, and often the latter method is the only one practicable. The latter method indicates an excess of work

done owing to the slip of the pump. In operation the pump valves do not close completely the instant the end of the stroke is reached, and consequently, a quantity of the water displaced by the plungers flows back into the water cylinder (or chamber) as the plungers begin the return stroke. This loss, with the leakage of the valves and plungers, and failure of the pump to fill completely at each stroke, make up what is known as the slip of the pumps. It is evident that the net delivery of water is somewhat smaller than the total volume displaced by the plungers. If the proper correction for slip is not made, it is clear that an error is introduced; and the greater the slip, the higher will be the apparent duty of the pump. If a given pump has a slip of 3 per cent., the net useful work will be 97 per cent. of the work calculated on the basis of plunger displacement; while with a ten per cent. slip, the net work would be but 90 per cent. of this amount. The total plunger displacement and the total head being the same in each of these supposed cases, the apparent delivery would be the same; but, evidently the latter pump (all other conditions being equal) would require less steam than the former (as it does less work) and the duty would be correspondingly changed if calculated on this basis. This point was well illustrated in a recent experience of the writer, in making some trials upon water and upon a thicker liquid, or mixture with the same plant. It was found that in the latter case the sluggish action of the valves so increased the slip that the pump had to run about 35 per cent. faster than with water, to give the same actual discharge; the net effective work being greatly reduced; though the steam consumption and plunger displacement were substantially the same in both cases.

The part of the slip made up by actual leakage of plungers, and of valves when closed, when estimated or measured by a special test, but that part due to the action of the valve cannot be so readily derived except in the unusual cases where the actual discharge can be measured. When the engine delivers into a reservoir, or the water can run to waste during the trial, weir measurements give a check on the total slip; but such conditions are rather exceptional, and even when applied they are subject to the errors of the weir measurement.

The determination of the leakage should be by a special test, and the computation of the percentage of leakage from these observations. This in part corrects for the slip but leaves the error due to defective action of the valves.

VEGETABLE GROWTH IN WATER MAINS.

A vegetable growth in the water mains at St. Paul, Minn., has lately, according to the *Engineering Record*, been the cause of some trouble. The first case was discovered by the superintendent, in one of two service pipes in a single trench supplying a double house. A complaint was made of bad water which flushing failed to improve. One of the pipes delivered pure water and one supplied a muddy liquid that was of no use. This fact led to the conclusion that one of the services was foul; and the remedy applied on this supposition proved effective. The boiler of a portable engine was connected with the faucet of the kitchen sink from which the muddy water came, and a steam pressure of 70 pounds forced against the 35 pounds water pressure for 30 minutes, thereby driving the water out of the pipe. Since that time the pipe has always delivered clear water, and twelve similar cases have been successfully treated in the same manner. Great care has to be taken that there are no leaks in the service pipes, and that none of the fittings are open during the steaming process.

Municipal officers, contractors and others, are requested to mention the CONTRACT RECORD when corresponding with advertisers.