

asphalt or vitrified brick at an approximate cost of \$15,000 and the track allowance between Davenport road and the C. P. R. tracks with cedar and granite on concrete, at a cost of \$5,000, with \$2,000 for widening the present cedar block pavement. Several property owners presented a petition against the proposed extension and the matter was referred back. — Mr. Edmund Wragge, local manager Grand Trunk Railway, invites tenders until 5 p. m. on Tuesday, the 18th inst., for elevators, elevator frames and stairway slate treads required in connection with the new Union Station. Plans may be seen at the office of the architects, Messrs. Strickland & Symons, Victoria street.

OTTAWA, ONT. J. S. J. Routhier, architect, will let the contract about the 1st of January for the erection of an addition to the convent of the Sisters of the Good Shepherd on St. Andrew street. The addition will be 108 x 89 feet in size, five stories high, built of stone and having metal roof, paneled ceilings, fire escapes, cement sidewalk, architectural iron work, frescoing, birch, maple and pine finish, office fixture, wood altar, pews, stained glass, electric bells and lighting, dumb waiters, freight elevator, laundry machinery, two boilers, hot water heating, etc. Estimated cost \$35,000. Construction work on the Ottawa, Arnprior and Parry Sound Railway has been discontinued for the season. About seventy miles of the road yet remains to be built.

A petition is being circulated for signatures among the ratepayers on Wellington street, asking for the construction of a permanent pavement on that street, the work to be carried out during 1895. — The City Council has decided to receive tenders until the 25th of January, for the different kinds of asphalt paving proposed to be constructed during next year. — The Dominion Government has decided to co-operate with the Government of British Columbia in constructing the necessary works to protect the inhabitants along the Fraser river from floods, and with that end in view the Minister of Public Works recommends that one or more engineers from the Department of Public Works be sent out to act in conjunction with officers of the British Columbia Government in making a thorough examination of the basin of the river, taking levels and securing other data, the cost of the commission not to exceed \$50,000.

FIRES.

The business portion of the town of Mount Stewart, P. E. I., about 14 miles from Charlottetown, was about totally destroyed by fire on Saturday last. Some of the burned buildings are James Ross' store, dwelling and warehouse; J. M. Egan & Co.'s store and warehouse; H. Coffin's store, James Coffin's dwelling and outbuilding; Gordon Douglas' store, S. C. Clarke's store and warehouse; J. McCarthy's store; James Gorman's dwelling; Hugh Currie's dwelling and A. McEachren's dwelling. About one-third of the loss is covered by insurance. — The residence of D. Milan, at Kingston, Ont., was destroyed by fire last week. Insurance \$1,800. — R. B. Jeffrey's saw mill at Victoria Road, Ont., was burned last week. Loss, \$10,000; no insurance. — The Globe hotel at Clarkstown, Ont., owned by Alfred Daze, was destroyed by fire on Saturday last. Loss \$2,000; insurance, \$800. — Robert Gaw & Co.'s planing mill at Kingston, Ont., was burned on the 8th inst. Loss, \$7,000; insurance, \$6,000. — A wholesale warehouse at 25 Front street west, Toronto, owned by Miss M. Staunton, was destroyed by fire on Tuesday. The damage to the building was about \$20,000. — The Ontario Malleable Iron Works at Oshawa, Ont., were destroyed by fire on the 11th inst. Loss, \$75,000; insurance, \$27,000. — The building occupied by A. J. Grant & Co., hardware at Halifax, N. S., was damaged by fire recently to the extent of \$3,000, which is covered by insurance. — Fire at Chilliwack, B. C., on the 4th inst. destroyed

James Chadcey's dwelling and the Odd-fellows block. The latter was insured for \$1,700.

CONTRACTS AWARDED.

MONTREAL, QUE.—At the last meeting of the Road Committee the contract for the extension of the Notre Dame street bridge across the C. P. R. yards, Dalhousie station, was awarded to the Dominion Bridge Co., of this city, at the tender of \$34,737.

CLINTON, ONT.—The County Council has awarded the contract for the erection of a House of Refuge for the County of Huron to S. S. Cooper, of this place, whose tender was \$9,874. The building will be situated one mile south of Clinton and is to be completed by 1st of October, 1895.

NEW COMPANIES.

PRESCOTT, ONT.—Prescott Elevator Co., seeking incorporation; capital, \$75,000; to erect a grain elevator at this place; applicants, J. W. McRae, Thos. Ahearn, of Ottawa, N. Willard, of Prescott, and others.

FORT COULONGE, ONT. Quinze Electric Co., applying for incorporation; capital \$50,000; to build and operate works for the production of electricity; applicants, John Bryson, of this town, J. M. McDougall, of Hull, and others.

DUNDAS, ONT.—Valley City Seating Co., incorporated; capital \$50,000; to manufacture furniture; incorporators, R. T. Wilson, J. D. Pennington, George Anderson, J. J. Steele and J. B. Grafton, of Dundas, and J. D. Evans, of Hamilton.

MONTREAL, QUE.—Stadacona Water and Light Company, applying for incorporation; capital \$40,000; to build aqueducts and supply water and light to towns and villages. — The Pratte Piano Company, seeking incorporation; capital \$200,000; to manufacture musical instruments; applicants, Hon. Alph. Desjardins, Joel Leduc, G. J. Shepherd and others. — Canadian Fire Extinguisher Co., applying for incorporation; capital \$50,000; applicants, J. S. Bosquet, banker, Moses Davis, broker, and others.

BUSINESS NOTES.

Williams Bros., builders, Toronto, have dissolved partnership.

N. Gauthier & Co., builders, Montreal, are offering to compromise at 25 cents on the dollar.

Laesser & Sprague, painters, Windsor, Ont., are said to be asking for an extension of time.

SOLDERING WITHOUT HEAT.

Soldering without heat, commonly called cold soldering, is a process not only possible but common, and, after the first preparation, is exceedingly simple. The process given has many uses for soldering all articles which cannot be got at with either copper or a blow-pipe. The process of cold soldering can be extended even to soldering two faces of dirty cast-iron together. It may be done on blocks of any size without the slightest assistance, so far as heating is concerned, by the following process: Although the first preparation is tedious, a large quantity of the material can be made at once, and the actual process is simple and quick. Flux: one part of metallic sodium to fifty or sixty parts of mercury. This must be kept in a stoppered bottle, closed from the air. It has the property of amalgamating (equivalent to tinning by heat) any metallic surface, cast iron included. Metallic sodium alloys with mercury by cautiously triturating the materials in small quantities at a time, in a Wedgewood mortar. If it be too much trouble to make, the sodium amalgam can be bought ready made from any chemist or dealer in reagents.

Solder: Make a weak solution of sulphate of copper (about ten oz. to one qt. of water). Precipitate the copper by rods of zinc; wash the precipitate two or three

times with hot water; drain the water off, and add for every three oz. of precipitate six oz. or seven oz. of mercury; add also a little sulphuric acid, to assist the combination of the two metals. The finely divided copper combines with the mercury, and they form a paste, which sets intensely hard in a few hours; and, while soft, this paste should be made into small pellets, which harden, and has the property of softening by heat and again hardening in a few hours. When wanted for use, heat one or more of the pellets until the mercury oozes out from the surface in small beads, shake or wipe these off, and rub the pellet into a soft paste in a small mortar, or by any other convenient means, until it is as smooth and soft as painters' white lead. This, when put on the surface amalgamated by the sodium and mercury, adheres firmly and sets perfectly hard in about three hours. The joint can be parted, if necessary, either by a hammer and cold chisel or by a heat about sufficient to melt plumbers' solder.

There are in Germany ten technical colleges, frequented by 6,434 students, who are taught by 535 professors, tutors, &c. The cost per annum of these establishments is 2,539,000 marks, so that the annual fee per student averages about £20, or rather less. Munich heads the list in point of numbers with 1,180 students; then comes Berlin, with 1,027; Hanover, with 746; Berlin (trades), 692; Dresden, 661; Aix-la-Chapelle, 605; Carlsruhe, 588; Stuttgart, 543; Darmstadt, 213; and Brunswick, 179. In Austria there are seven such colleges, with 345 professors and 4,073 students, that at Vienna alone accommodating 1,545, or more than one-third. France has only three, with 155 professors and 1,175 students; but little Belgium has six, with sixty-six masters and 693 pupils. Italy can boast of nine technical colleges, with 157 teachers and 2,113 students, of whom, however, 779 are at the universities where the civil engineer diplomas are conferred.

MUNICIPAL DEPARTMENT.

THE MANUFACTURE AND USE OF PAVING BRICK.

(Continued.)

The large majority of specifications for paving brick are entirely inadequate. They are vague and often meaningless. It should be remembered that each additional requirement cuts out certain classes of brick, lessens the competition and in that way, and by reason of the extra cost in the manufacture of a higher grade article, increases the price of the finished pavement. It must also be observed that with the present demand for paving brick and the state of the manufacture in many places where factories have been recently established it will often be impossible to obtain brick which will fall within the higher limit herein named. Hence, the engineer should assure himself of the best quality of brick which can be obtained in sufficient quantities for his use, before adopting specifications calling for any particular grades of paving brick.

The use of brick for paving in the United States has been confined to the last two decades. Its first use was in Charlestown, W. Va., and at Bloomington, Ill., about twenty years ago. From these points, with their small beginnings, its use has spread until at present it is one of the most popular and widely used of all paving material. A discussion of the principles that underlie brick paving would be a discussion of the principles of all paving. This material simply offers a surface covering, smooth and even, but not slippery, durable, economical and highly sanitary. It must be laid on a foundation drained and prepared as for all pavements. Beyond this the success of the pavement depends on the proper selection of the material. With poor material it will prove a failure, as has been shown by the attempt to utilize common

building brick at Nashville, Tenn., and elsewhere. With proper material it is an established success, and is destined, with the improvement in manufacture and the bettering and cheapening of the product thereby, to rank first in economy and availability of all paving material. In the majority of places it offers a possible local industry, when the availability of the local geological resources are better known and appreciated, and the different methods of utilizing them in manufacturing are more thoroughly understood. In first cost the pavement depends on the nearness of the manufactories and the local resources suitable for foundation.

For light traffic the fragmentary materials (rubble, gravel, sand, etc.) or sand with a layer of brick laid on their side, or six inches of concrete, make good foundations, the selection depending on local resources. For medium traffic nine inches of stone or gravel, or six inches of gravel or stone, with a layer of brick laid on their sides, bedded in sand, or six inches of concrete, will give good results. For heavy traffic the stone or gravel should be at least one foot in thickness, or the concrete at least nine inches. All sub-foundations which are retentive of water should be properly and thoroughly drained. In the average city the network of pipes and conduits laid below the street surface is the cause of frequent disturbances of the pavement, which is often the leading factor in its destruction. The facility with which pavements can be taken up and replaced becomes, under such circumstances, quite important. In this, brick pavement is second to none. The brick, being uniform in size and shape can be returned to their places by unskilled labor, an important point in smaller towns and cities. This is especially true if the fragmentary foundations are used, and if sand only is used in the joints. Whether either coal tar or cement grout is used in the joints, the bricks taken up are difficult and often impossible to clean, and new material has to be substituted. With sand in the joints, the old material is readily cleaned, and the sand, in two weeks' time after laying, renders the pavements as impervious to the seepage of surface waters, as the tar or cement. The durability of brick pavements is a subject open to enquiry, for the limited time they have been in extensive use has been too short to answer this from practical experience. The destruction of a pavement results from (1) the crushing by the wheel load; (2) the abrasion by friction of passing vehicles and the slipping of horses' shoes; (3) the impact due to the passage of loads over a rough surface, and the impact from the shoes of horses. The smoothness of the brick will, in the opinion of the writer, more than overcome the difference in abrasive resistance of the granite. The writer estimates the life of first-class brick pavements to be: For light traffic, 35 to 50 years; for medium traffic, 20 to 25 years; for heavy traffic, 10 to 15 years.

WIDTH OF THE ROADWAY.

The traveled part of the road should be of uniform width, and the two sides should be parallel if possible, says the Brickmaker. Sometimes a width of 10 feet will be enough, but 16 feet is about right where much travel is to be provided for. In some parts of the country, where the width of the highway between fences has been fixed at 40 feet or more, the roadmaker is often tempted to make the wagon way 18 or 20 and in some cases even 24 feet wide, but unless special reason exists in certain localities, it is a waste of time and labor to construct this extra width and a perpetual expense to keep it in repair.

In the vicinity of large towns, where the wagon travel is great, and in approaching railway stations where much hauling is done, it may be necessary to make the width greater than 18 feet, but in most cases where the traffic is so important as to require an increased width it will be good economy to abolish the dirt road and substitute a good vitrified brick pavement even at the greater first cost.