

to M. Lacroix, and that for pews for St. Infant Jesus church to Jos. Lesperance.—Hutchison & Wood, architects, have let the contract for the French Theatre Francais as follows: Masonry, Mr. Barbeau; brick work, Mr. Beland.

TORONTO, ONT.—Contracts have recently been awarded the Forbes Roofing Co. as follows: National Automobile Works, Hamilton; Welland Vale factory, St. Catharines; T. Eaton Co.'s new buildings; Woodgate & Co.'s factory, Guelph; R. Forbes & Co.'s woollen mills, Hespeler.—The city council last week accepted the following tenders for concrete sidewalks: A. Gardner & Company—St. Vincent street, east side, Grenville to Grosvenor, 1.25 per lineal foot; Huntley street, east side, Selby to Bloor, 74 cents; Elgin avenue, north side, Avenue road to Bedford road, 62 cents; Winchester street, north side, Parliament to Sumach, 65 cents; Cecil street, north side, Henry to Beverley, 54 cents; Borden street, east side, College to Ulster, 52 cents; Maple avenue, both sides, Sherbourne to Glen road, 68 cents. W. R. Payne & Company—Euclid avenue, both sides, College to Ulster, 73 cents; Carlton street, south side, Parliament to Sackville, 72 cents. J. H. McKnight—King street, north side, St. Paul to Sackville, at \$1.04. City Engineer—Gloucester street, south side, Church to Jarvis, at \$1.30, and South Drive, north side, from north to east limit of lot 1, at 60 cents.

#### BIDS.

LINDSAY, ONT.—Following were the tenders received by the corporation for construction of sewers: F. J. Beharriell, Toronto, \$5,463; Jas. McKnight, Toronto, \$5,089; John Hartnett, Toronto, \$5,400; P. J. Pilkie, Lindsay, \$2,981. W. T. Ashbridge, of Toronto, is consulting engineer.

TORONTO, ONT.—Following are the lowest tenders submitted for alterations required in the Athletic club building to fit it for a technical school: Brick work, Wickett Bros., \$631; carpenter work, John C. Lyon, \$5,519; plumbing and heating, Purdy, Mansell & Co., \$1,880; ventilation, Geo. M. Bryan, \$1,170; painting and glazing, F. E. Phillips, \$400; plastering, John Boyce, \$775; electrical work, H. F. Stickland, \$750; fire escapes, McGregor & McIntyre, \$318; total \$9,943.

#### PROTECTING IRONWORK.

In a paper recently read before the Newcastle section of the Society of Chemical Industry, Mr. Harry Smith, F. I. C., describes a series of very interesting experiments upon the comparative protective powers of different paints as applied to ironwork. Three series of experiments were made, and are described in Engineering. In the first series a method originating with Mr. Max Toltze was employed. A number of iron dishes, 5 in. across and about ½ in. deep, were cleaned and carefully painted with two coats of the paint to be tested. These dishes were then filled with water, which was allowed to completely evaporate at the ordinary temperature of the laboratory, after which the dish was again filled up, this operation being repeated six times in the course of the six months over which the experiments extended. The paints used were prepared by grinding the pigments with linseed oil on granite rollers to a stiff paste, which was then thinned with best quality boiled linseed oil—itsself

capable of drying in seven hours to a hard film when painted on to a glass plate. Thus tested, the only paints which remained practically unaffected were red-lead or orange-lead paints, some of which, however, such as the "vermillionette" and the scarlet-red paints, contained also a certain proportion of aniline colours; while two of the red-lead paints contained, in the one case forty-five per cent., and in the other sixty-six per cent. of barytes. All the other dishes were more or less rusted, the order of merit of the better paints being as follows: 1. Zinc-white. 2. Equal parts zinc-white and barytes. 3. Zinc-white, three parts; barytes, seven parts. 4. Lithopone (a mixture of zinc-sulphide, zinc-oxide, and barium-sulphate). 5. Pure white lead. 6. White lead, 5'37 parts; barytes, 4'03 parts. 7. White lead 5'05 parts; barytes 4'21 parts. All the other paints, thirty-six in number, proved very inefficient, the first dish to show signs of rust being that painted simply with linseed oil. In the second series of experiments a number of painted iron plates were exposed to the weather for a twelvemonth, and with the single exception of the plate painted simply with linseed oil, all withstood the test remarkably well. In the third series of tests, strips of iron were painted, and when the second coat was quite dry these strips were placed in wide-mouthed glass bottles, which were then nearly filled with water, and allowed to stand. The bottles were not closed, but the contents were protected from dirt by standing them under a shelf, there being about ½ in. of space between the top of the bottles and the underside of this shelf. The bottles were left untouched for three months. Some of the plates were sensibly affected within seven days; but those which successfully withstood the shallow-dish test also resisted this one most successfully. The fact that paints containing such large proportions of barytes as some of the lead paints noted above gave such excellent results is of much interest, as it goes to show that this material can hardly be considered as a mere adulterant. In fact, one paint made up only of barytes and linseed oil gave better results than an oxide of iron paint. Mr. Smith refers with approval to the methods adopted in painting the Forth Bridge. All plates and bars for that structure were cleaned with steel scrapers and wire brushes, and then coated with hot linseed oil. As soon as possible after erection they received two coats of red-lead paint, which were subsequently followed by two coats of iron-oxide. The life of the paint on the upper portions exposed to the weather is found to be about three years; but it must be added that the paint is then still in good condition, and on less important bridges would by many engineers be allowed to pass for several years longer. Experience shows, however, that in such

cases the metal is liable to be deeply pitted. The paint inside the tubes of the Forth Bridge is as perfect as when first applied, twelve years ago. The parts of the bridge most subject to rust are near the water, where the underside of the girders get sprayed with salt. The rusting commences on the rivet-heads and the edges of the plates. These portions of the bridge are cleaned and repainted every year.—Illustrated Carpenter and Builder.

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