

composition of the paste used. The resistance to exterior pressure is the most important property in a cement or clay pipe; for, with a few exceptions, such pipes are simply covered with earth or sand, and are not placed in masonry. The pressure upon them will differ as these pipes are laid under traveled streets, under railway embankments, or under the foundation walls of buildings; and it is necessary, in passing judgment upon the fitness of these pipes, to distinguish between the loads to which they are to be subjected in use. Mr. Gary then details the practice of a number of German cities in the test of cement pipe, as follows. The Department of Public Works of Liegnitz requires that a cement pipe one meter (3.28 feet) diameter should resist the pressure of a layer of earth 3 meters (9.84 feet) thick; at Rosenheim, pipes covered with 12 to 16 inches of earth should resist the pressure of a heavy vehicle; and at Colmar, when there is any doubt of the solidity of a pipe, a loaded wagon is passed over the laid pipe. At Schwerin, in Mecklenburg, cement pipes must resist, without cracking, a pressure equal to 50 kilograms per linear meter and per centimeter of diameter. This test is made by placing railway rails on the top of the uncovered pipe. The city of Freysing prescribes that the pipe should support a "load of 6,000 kilos, concentrated upon the top of the pipe," and Passau demands that the pipe resist a pressure of 805 lbs. per lineal foot. At Zeitz, where the pipes are buried 6 to 8 feet beneath the surface, a steam road roller is passed over them before acceptance. Clay pipes, 1 meter diameter, have been tested at Mannheim, by burying them in the earth, with a covering layer about 18 inches thick. Over the pipe was then placed a double plank platform, about 3 inches thick in all, and 3.28 feet square, and on this was placed the test load. The rupturing load was found to be about 28,600 lbs.

For the test pipes of "armed-cement," or cement reinforced by a double iron mesh on the Zissler system, the engineer of bridges, at Breme, prescribes the following test: The pipe is buried in sand in a solid wooden box, then by means of a cover fitting inside the box a pressure of 7,500 kilos, per running meter, or about 500 lbs. per lineal foot, is applied to the pipe. The pipe is required to stand this pressure without deformation or cracking. For pipes of oval section, 12x9.5 cm., and sides 6.5 cm. thick, armed with three layers of metallic mesh, a uniform load of 9,000 kilos, per meter, or a little over 600 lbs. per foot is prescribed. At the Hague the resistance of beton pipes is determined by placing them in a trench and then loading them uniformly on the square meter of horizontal projection. One pipe in each 50 is submitted to this test; and this load is carried up to 12,000 kilos, for pipes 1.5x1 m. and 1.2x0.8 m. At Copenhagen, Emanuel Jensen employs a process for testing pipes of clay and of "armed-cement" which has given very satisfactory results. A heavy timber is embedded in the soil carrying upon one end a heavy counterweight of cement, and near this are two bars of iron, pierced with holes, attached to the sides of the timber. The pipe to be tested is placed in a strong wooden box, nearly filled with sand, and resting upon the timber, and pressure is applied to it by a lever and saddle with the lever support on a pin passing through the holes in the iron bars. The advantage of this process is that the commencement of cracking in the pipe can be noted; though this is of little advantage in the test of clay pipes, as after the appearance of the first crack the pipe will support but little more. But in the case of the Monier and Zissler construction, where the iron skeleton augments the cohesion of the material, the appearance of the first fissure precedes by some time the final crushing load.

At the test laboratory at Malines, the resistance of pipes to exterior pressure is tested by a Kirkaldy machine; the pipe being placed between two wooden saddles which each embrace one-third of the circumference of the pipe. But as it is difficult to insure contact with all the inequalities of the pipe, the process is not satisfactory. From the report of Mr. Gary it seems, The Engineering News concludes, that about the only sewer pipe tests so far employed relate to the resistance against exterior pressure; and he well remarks that a uniform, systematic and reasonable test of sewer pipe, of various materials, has yet to be devised; or at least, to be introduced, into general practice.

—A valuable product for the color industry is the soot of acetylene flames. It is absolutely black without any tinge of brown, and has very little weight. By reason of its bulk it is specially fitted for India ink as well as for colors used in

printing and photography. No tarry admixtures, or other substances contained in lampblack, are found in it, and the yield when acetylene is burned with a smoking flame is three to four times as large as from the same quantity of mineral oil. A Frenchman has recently secured a patent on three methods for producing the color.

FIRES OF THE MONTH.

Sept. 6th. The new mill of the estate Masson at Terrebonne, Que., was destroyed, together with a grist mill, and the Terrebonne Electric Light Co.'s plant; loss, estate Masson, \$10,000; fully insured; Electric Light Co., \$1,500, insurance, \$700.—Sept. 13th. D. A. Ghent's carriage factory, Burlington, Ont.; loss, \$8,000.—Sept. 15th. The Belleville, Ont., Gas Works were damaged to the extent of \$500.—Sept. 16th. The Montreal Street Railway Co.'s car sheds; damages, \$200,000; fully insured.—Sept. 18th. W. G. Harris' mill stock and metal premises, Toronto, were burned down; loss, \$8,000.

WANTED—Position by stationary engineer, second-class certificate of the Ontario Association. Ten years' experience, strictly temperate. Apply "NORWOOD," care Canadian Engineer.

School of Mining, Kingston, Ont.

This school offers three years' courses for diplomas and four years' courses for degrees in Mining Engineering, Metallurgy and Assaying. Also shorter courses for prospectors and others. The instruction is thoroughly practical. The school has a well equipped

Mining Laboratory,

in which extracting and concentrating by amalgamation, chlorination, etc., processes are studied on a large scale. For calendar and other information, apply to the Director.



McGill University

MONTREAL

Offers courses in Architecture, Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Practical Chemistry.

Four years under-graduate courses, partial courses and facilities for graduate work in all departments.

For descriptive pamphlet or information, address,

W. VAUGHAN, Registrar.

TENDERS FOR BRIDGE CONSTRUCTION

OFFICE OF THE QUEBEC BRIDGE CO., LIMITED

Sealed proposals for the construction of a combined Railway and Highway Bridge across the River St. Lawrence, near Quebec, will be received by the undersigned until noon, Monday, January 2nd, 1899.

Forms of tender, with circular of conditions, specifications, &c., can be had on application to the undersigned.

The company does not bind itself to accept the lowest or any tender.

ULRIC BARTHE, Secretary

Quebec, September 24th, 1898

Just Published The latest and best book on the subject

HANDBOOK OF

Corliss Steam Engines,

BY F. W. SHILLITTO, JR.

Describing in a comprehensive manner the erection of Corliss Engines, the adjustment of Corliss Valve Gear, and the care and management of Corliss Steam Engines.

Illustrated by 64 original engravings made especially for this book. 224 pages. Price—Bound in Green Silk Cloth, \$1.00; Green Silk Cloth, pocket-book form \$1.50; Russia Leather, pocket-book form, \$2.00.

Send for complete Descriptive Circular and new Catalogue of Books. Sample copy of American Engineering free.

The American Industrial Publishing Co.
Publishers, Booksellers and Importers.

BOX 110

BRIDGEPORT, CONN.