a large number, but the system of maintenance is such that each hydrant is examined and repaired if necessary immediately after going out-of service at a fire by an experienced machinist who reports to a follow-up system that the hydrant has been examined by him and left in good condition. The firemen, after an alarm, are the only users of the hydrants. Should any one else open a hydrant it is immediately known by an alarm bell operated by the Venturi meter recorder on the priming line.

During the past six years many miles of streets have been opened for the construction of the rapid transit subways, exposing over 54,000 lin. ft. of the high-pressure mains. No leakage has been found in the joints except an occasional sweat and from this evidence the Bureau of Water Supply is inclined to believe that the loss of water is not at the joints.





The above chart gives the result of a test under varying pressure made Dec. 8th, 1916. Attention is called to the almost straight line of the upper portion of the curve, which seems to indicate that the leakage is not from fixed openings, from which a leakage varying as the square of the pressure should be expected.

It may be that the symmetrical results obtained and shown on the curve are but accidental; that as the pressure increased the main valves of the hydrants, which close under pressure, closed more tightly, reducing the leakage in the hydrant; that at the same time stuffing boxes in valves which are tight under low pressure might leak under the higher; that cracks in the pipe or steel casting not open under low pressure open under the higher.

Light charges of dynamite were used with success in breaking up reinforced concrete columns at the Colorado State College of Agriculture. The columns were 4 ft. square and 31% ft. long, and were intended originally for cores of ornamental posts. They were built with twisted steel rein-forcing bars, and conduit pipes for electric wiring were placed in the centre. In addition to the rod reinforcing, there was an extra reinforcing of wiring in portions of the posts. In breaking up the columns it was necessary to use small shots because of the nearness of buildings,-one structure being within 100 ft. of where the posts lay. The charge consisted of a ¼ stick of dynamite, which was inserted in a hole drilled in the column. This method broke the posts to pieces so successfully that the reinforcing and electric conduits were removed intact without injury. The cost in labor was about \$4 for all of the posts. To this labor cost must be added the cost of the dynamite. About eight sticks were required for the whole job.

CATCH-BASIN CLEANING

THE following facts relating to catch-basin cleaning are taken from the annual report of the superintendent of the Bureau of Sewers, Chicago, and de-

scribe work done in the seven districts into which that city is divided :-

"6,755,100 feet of sewer flushed at a cost of \$40,596.60; 542,400 feet of sewer scraped at a cost of \$49,948.79; 41,231 catch-basin cleanings by hand at a cost of \$116,500.55; 1,729 catch-basin cleanings by autoeductor at a cost of \$1,552.31; and opening inlets, answering complaints, etc., at a cost of \$57,069.14; to which costs are added \$3,697.15 for supplies, materials, etc.

"The costs given include a proportional part of salaries of district foremen and assistant foremen. Of the total cost, \$185,907.29 is for salaries and wages and \$79,-760.50 for teams, horses and carts. In the case of the auto-eductor the amount given is for wages of crew, to which should be added \$475.51 for supplies and repairs, interest at 4 per cent. (for the five months after it went into operation) \$116.66, and depreciation at 10 cts. per mile, \$229.30. This gives a total cost of \$2,373.78, giving an average per basin cleaning of \$1.375 and per cubic yard removed of \$0.81; as compared with a cost of \$2.83 per cleaning by hand. In cleaning the 1,726 basins and removing 2,929 cubic yards of material the auto-eductor traveled 2,293 miles and hauled 490 loads to the dump.

Otterson Eductor

"On the 1st of August the Bureau of Sewers placed into service in the First Cleaning District a catch-basin cleaning device known as the Otterson Eductor. This is, in general, a Kelly-Springfield 5-ton motor-driven vehicle, on which is mounted a centrifugal pump. The vehicle and the pump are driven by the same motor. The cleaning is done by the use of a jet in the discharge pipe of the pump, a flexible loop of the discharge pipe containing the By this method the jet being lowered into the basin. solids from the basin do not pass through the pump itself. The wastes are discharged into a box mounted on the eductor, the box being of sufficient size to contain the material taken from three or four basins.

"Water for the pump is drawn from the wagon box, the solids in the box being retained by the use of baffles. Thus a continuous circulation is maintained from box to pump and from pump to box until the capacity of the box for solids is reached, at which time the machine is run to a dump and unloaded, the unloading being accomplished by a tipping device operated by the vehicle motor."

Costs by Hand and Machine

The success of the machine may be best given by a statement of costs of hand cleaning and machine cleaning in the First Cleaning District, the machine-cleaning cover-ing a period of five months. These are as follows :---

Costs per catch-basin cleaning in the First Cleaning District: By hand, \$3.37; by auto-eductor, \$1.37. "In addition to being approximately 60 per cent. cheaper, it is a more sanitary and cleanly method," says the report.

At present the Bureau of Sewers has seven-autoeductors in service. The first was placed in commission in July as an experiment, and given a thorough test, following which six more were brought and placed in service in April of this year. The result of their operation is such that Mr. McGrath has recommended to the city council the purchase of four more. Those in use save