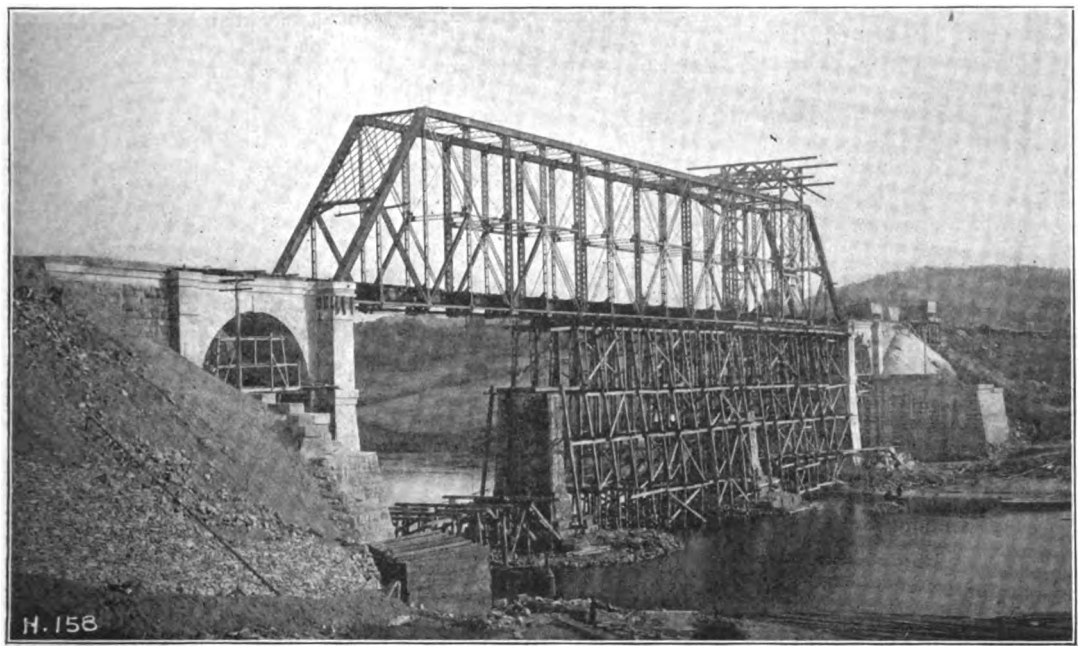
conductors for the stray earth currents, and so to some extent they are reported to protect the iron mains. A trace of attack was seen in an iron pipe laid bare for the purpose of making measurements, and this was also close to the older central station. The condition of affairs at Dresden can only be slightly improved by a regulation of the return conductors. This would ensure a constant potential at all taking-off points; but the escape of current into the earth, and its re-entry into the conductors at suitable spots, can only be avoided by the employment of insulated returns. Some such are now being laid.

The committee was especially asked to examine the case of a 4-in. water main which had been in use for thirty years at Strasburg, and which had got so corroded that a length of 150 yd. had to be renewed. Previous measurements had shown that the pipe lay in a district neutral as regards potential, where neither protection nor corrosion might be expected; and it was therefore thought either that an escape of current from the pipe into the earth (but not into the rails) had been brought about by badly made joints which offered some resistance to the passage of electricity, aided by much ground water and the presence of some other good conductor, or else that the damage might have been done at a former time when electrical conditions might have been different. The joints were found bad in places, and the ground water high; and it was noticed that the pipe lay close to the River Ill, which also flows past the central station. On the other hand, a second main, of equal age, lying in similar soil, in a parallel street, but one in which no tramway ran, was not corroded; and, moreover, the corroded spots in the former were not distributed uniformly round the pipe, but were accumulated at the side facing the rails. Further measurements were made which agreed with the earlier ones; the currents flowing in the mains, and their irregularities due to fluctuations in the working of the tram service, were found to be too small to account for the damage. In the meantime, the old 4-in. main was replaced by one of 6 in., and conditions were somewhat altered.

Inasmuch, however, as this case of corrosion is typical, and it is very important that the matter shall be thoroughly studied, the committee has determined to institute experiments to ascertain whether it is possible for iron to be corroded in a fashion resembling that of the pipe in question when lying in soil of the composition of that in Strasburg, without the assistance of external energy; and, if so, whether the process is accompanied by any local manifestations which can be detected with certainty and measured with fair accuracy. To this end, the committee has sought the aid of a chemist and an electro-chemist, whose researches have already begun.

The Croton Lake Railroad Bridge.

The tracks of the Putnam division of the New York Central & Hudson River R. R. were formerly carried over Croton Lake by a deck bridge with three pin-connected spans 156 ft. 9 in. long, 25 ft. 4 in. deep and 13 ft. apart on centers, which were supported on two masonry piers and two abutments. The recent construction of the new Croton dam will back the water up at the bridge



New Bridge Replacing Three Old Highway Spans, Croton Valley, N. Y.

site to a maximum depth of about 40 ft., submerging the old piers. This required considerable changes in the bridge, and it was deemed advisable to replace the three old spans by a new structure having a 384-ft. pin connected through span with trusses 53 ft. 4 in. deep and 21 ft. 4 in. apart on centers. They carry two lines of plate-girder stringers with track 33 ft. above the new water level. They are supported on concrete piers made integral with full-centered concrete arches extending to the old abutments, as shown in the accompanying illustration. These arches have a span of 37 ft. 8 in. between springing lines and are designed to make the appearance of the bridge more effective and pleasing.

The steel superstructure was erected with an ordinary wooden traveler and three-story framed falsework about 90 ft. high from the bottom of the river. The upper stories had two plumb posts and two batter posts in each bent, which were seated on a transverse row of six piles capped about 16 ft. above water level and braced transversely and longitudinally between water level and the tops of the bents. The old span and the traveler track were supported from the falsework caps by solid timber blocking with the upper courses cantilevered a little beyond the second courses to support the top chords of the old trusses, the bottom chords being wedged up from the caps next below the top of the falsework. As the old structure was removed, the members were match-marked for re-erection at other sites.

The new concrete piers were built in open cofferdams and are supported on pile foundations with their tops enclosed by battered concrete footings reinforced at the base by two crossed tiers of grillage rails just above the pile tops. The tops of the piers are also reinforced by horizontal transverse rails bedded in the concrete. The pier masonry and the haunches of the arches are made with 1:3:6 concrete, and the arch ring 3 ft. thick at the crown is made with 1:2:4 concrete reinforced by one sheet of Clinton wire cloth 4 in. from the intrados and another sheet 4 in. from the extrados. The cloth is made with 3x8-in. meshes, using No. 6 wire longitudinally and No. 8 wire transversely. The projecting keys and the faces of the arch ring are coursed to resemble cut stone. At the elevation of the truss seats, the pier is capped with 1:1:2 concrete 2 ft. thick, having 4 in. projection. This coping is reinforced with wire cloth and old rails extending from end to end of the pier. On top of this coping and between the trusses the masonry is built up to form the stringer seat. The upper 2 ft. of this stringer seat is of 1:1:2 concrete reinforced in the same manner as the main coping below. The spandrel walls extend over the pier, forming parapets outside of the truss shoes.

The principal quantities in the structure include about 446 cu. yd. of 1:2:4 concrete, 2,973 cu. yd. of 1:3:6 concrete, 378 cu. yd of 1:4:7½ concrete, and a small quantity of 1:1:2 concrete, all made of Atlas Portland cement. There are 6,560 sq. ft. of wire cloth and 2,584 lin. ft. of white oak piles shod with iron points.

The bridge was designed by the engineering department of the New York Central & Hudson River R. R., Mr. H. Fernstrom, chief engineer, and Mr. Olaf Hoff, engineer of structures at that time. The steelwork was erected by the employes of the railroad company. The sub-structure work was done under contract by the United Engineering & Contracting Co., 21 Park Row, New York.

A Legal Opinion on Pavement.

PAVING CONTRACTS in Kansas City were recently before the Missouri Supreme Court for interpretation, 83 S. W. Rep. 1062, and it was then decided that a provision requiring the contractor to keep an asphalt pavement in repair for five years was not void on the ground that the city charter does not permit charging abutting property for repairs. It was also decided that where a street improvement is contracted for as a whole, the fact that, owing to the presence of street car tracks, only half as much paving was laid by the contractor in front of certain property as was laid in front of property on another part of the street, did not render invalid the apportionment of the cost of the entire improvement according to the front-foot rule. Where a street improvement ordinance and contract required the work to be commenced at a certain time and completed within 60 days, the fact that the contract provided that no work should be done on any day when the temperature was below 35° and that there were not 60 days between the time for commencement and the time for completion when the temperature was above 35°, does not excuse, the court rules, the contractor's failure to complete the work in the time fixed.

THE TESTING STATION of the British Fire Prevention Committee has recently been moved to a new site, where a number of new test huts have been erected. The fuel generally used will be gas supplied by a Mason producer, and will enter the main room of each hut from a mixing chamber. For temperature measurements Roberts-Austen recording pyrometers are employed. The station is near Charing Cross, to enable London committeemen to supervise tests readily.