cities and villages of Westchester County with their rapidly increasing population.

The evidence on the part of the petitioners, given by engineer experts, is to the effect that the sewage from this institution can be treated by means of a sewage disposal plant or otherwise so as to be innocuous and to prevent any danger of pollution to the city's water supply.

The evidence of the experts for the city and the engineers in charge of the work of preventing the pollution of the present supply is to the effect that it is not possible entirely to prevent such pollution and safeguard the water supply, and that such a sewage disposal plant would not at all times be efficient in operation and that there would be danger of pollution of the water supply, and their tendency as to the experience of the city with other plants would seem to confirm this view.

Undoubtedly, says Dr. Porter, it would be possible to dispose of the sewage from an institution of this kind so that it would not be a menace to the water supply. The practical question remains as to whether or not this would be done. This involves a certain degree of expert and efficient management of such a disposal plant and in this we must be guided by past experience. The public works of municipalities and institutions conducted by them are subject to changes in political control incident to our form of government and it can safely be stated that these changes not infrequently fail to provide that degree of stability of management and expert control that is to be desired. There can be no positive assurance that a sewage disposal plant, such as it is contemplated erecting, would always be operated at a maximum of efficiency, and if this is the case a danger of contamination of the water supply would result. Every protection against water-borne diseases that the law can give or science afford should be available to the city.

It should also be borne in mind, according to Dr. Porter, that the city of New York has power under the law to protect its watershed from contamination and that the establishment of this institution at a point where it threatened the water supply might result in proceedings against it by the city, which would be exceedingly expensive to the county.

In view of the possibilities of danger, great caution is necessary and in face of the serious protests of those charged with the protection of the water supply of the city of New York from contamination, Dr. Porter said that he could not accept the responsibility of granting approval to this site.

Other sites are available where these dangers do not exist. After carefully reviewing the evidence in this case and the briefs of counsel the application was denied.

Concrete Street Underpass beneath Six Tracks

In the construction of the St. Paul & Kansas City Short Line Railroad, which was described in the Engineering Record of August 31, the crossings over city streets were made in several cases on reinforced concrete bridges having ballasted slab floors with concrete pier bents as intermediate supports. One of these structures, located north of Armory Avenue, in Chariton, Iowa, carries six tracks and two team platforms, giving it an overall width ot about 130 ft. along the line of the street.

Design of Deck Slabs

The type of construction and the arrangement of tracks and platforms are shown in the accompanying drawing. The deck of the structure is made up of five main slabs of two types, one designed for the heavy, concentrated track loads and the other for heavy team loads. The loading used in the design of the track slabs was Cooper's E-55 plus 50 per cent impact, while the teamways were calculated for a 24-ton truck with 25 per cent impact. The track slabs over the street are 2 ft. 7 in. deep, reinforced with 24-in. 80-lb. I-beams, 1 ft. 2 in. centers, and lighter beams midway between pairs of tracks and at the edges. The latter are inserted to carry dead load and to assist in case of derailment. Planes of bars placed above and below the beams prevent the concrete from cracking away from the beam flanges. The slabs over the sidewalks are reinforced with bars only, the depth at this point being maintained the same as that of the slabs over the roadway for the sake of appearance and simplicity of framework. The teamway slabs are entirely of reinforced concrete and of the same depth as the track slabs, the desire being to obtain uniformity of lines beneath in the subway. Two strips of tar paper are placed in the joints between slabs.

Concrete Pier Bents

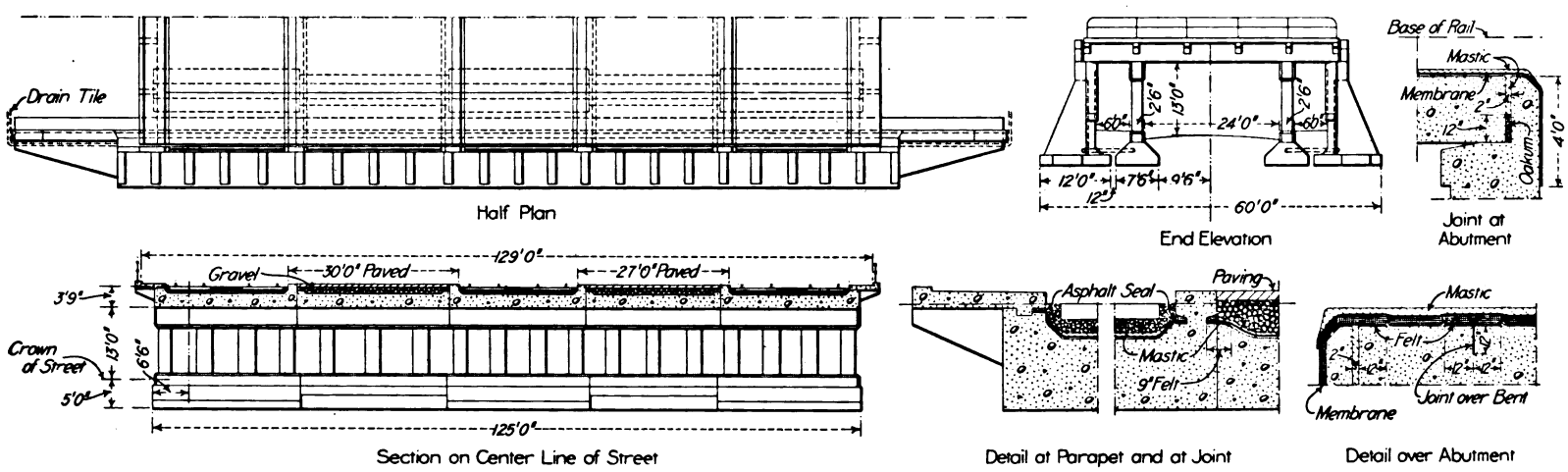
The two pier bents, supporting the concrete slabs at the curb lines of the street, are each made up of five abutting sections corresponding to the slabs above and separated at the contact faces by layers of tar paper, as in the case of the slabs. The joints of the girders forming the caps of the bents coincide with those in the slabs above, while the joints in the foundation courses are so placed as to give slightly greater width of bearing to the sections of the bents under the tracks than to those under the platforms, where the loads are lighter. The sectional arrangement of slabs and bents was selected to avoid the possibility of cracks developing in the foundation or the caps of the bents, caused by unequal settlement under tracks and platforms, although it was endeavored to obtain as near uniform intensities of pressure throughout as possible. The girders, columns and bases of these bents are reinforced entirely with bars. The columns in the bents are 2 ft. x 2 ft. 6 in., except directly under the tracks, where they are 2 ft. x 3 ft. They are spaced about 7 and 8 ft. on centers.

The abutments are of reinforced concrete, and of the buttress type. The buttresses are spaced on 6½-ft. centers and are 18 in. thick.

Waterproofing Details

The slabs are waterproofed with four plies of tarred felt and one ply of Tartex, the materials being furnished by the Barrett Manufacturing Company. At the joints between slabs, the joints over bents and those between slabs and back walls, an extra layer of Tartex is applied beneath the regular membrane and is so laid as to allow movement to take place without rupturing the membrane. The joints between the slabs and the abutments are filled with pitch over a 12-in. packing of oakum. At the vertical joints between adjoining slabs and at parapets, the waterproofing membrane is flashed into grooves and sealed with pitch. These details are shown in the accompanying drawing. Over the completed membrane a 2-in. protective covering of mastic is then laid, composed of one part pitch, two parts sand and three parts gravel. The mastic is discontinued at the outside edge of the back wall of the abutments, but a curtain membrane of the same composition as on the slabs is carried downward to a point approximately 1 ft. below the bridge seat. This membrane will be protected by a layer of brick or concrete.

The work on the St. Paul & Kansas City Short Line, of which this subway forms a part, is being carried out by the engineering department of the Chicago, Rock Island & Pacific Railway, of which Mr. J. B. Berry is chief engineer and Mr. I. L. Simmons is bridge engineer.



Type of Construction of Street Underpass and Details of Waterproofing

River Regulation and Power Development of an extensive nature are proposed for certain of the streams in the Congo district of Africa. An accurate survey of streams, aggregating in length over 450 miles, is at present being conducted by Swedish engineers. From the data thus secured, plans will be made of such construction as will be required to render these streams navigable and the feasibility of utilizing their waters for hydro-electric development will likewise be investigated.