History of the Railroad in the German Protectorate in China.*

It will be remembered that the German-Chinese Treaty of March, 1898, followed by the concession of June, 1899, provided for building a railroad in the province of Shan Tung. This railroad was planned to extend from Tsing Tow to Tsin Anfow, the capital of the province of Shan Tung. Branch lines were also provided for. The railroad system is to extend 800 miles in the shape of an equilateral triangle, which will surround the mountainous interior, while the railroad itself will run through partly hilly and partly flat country, densely populated and very fruitful. The population is almost exclusively agricultural, which fact would point to an important passenger and freight traffic in the future. The line also intersects several of the largest coal fields.

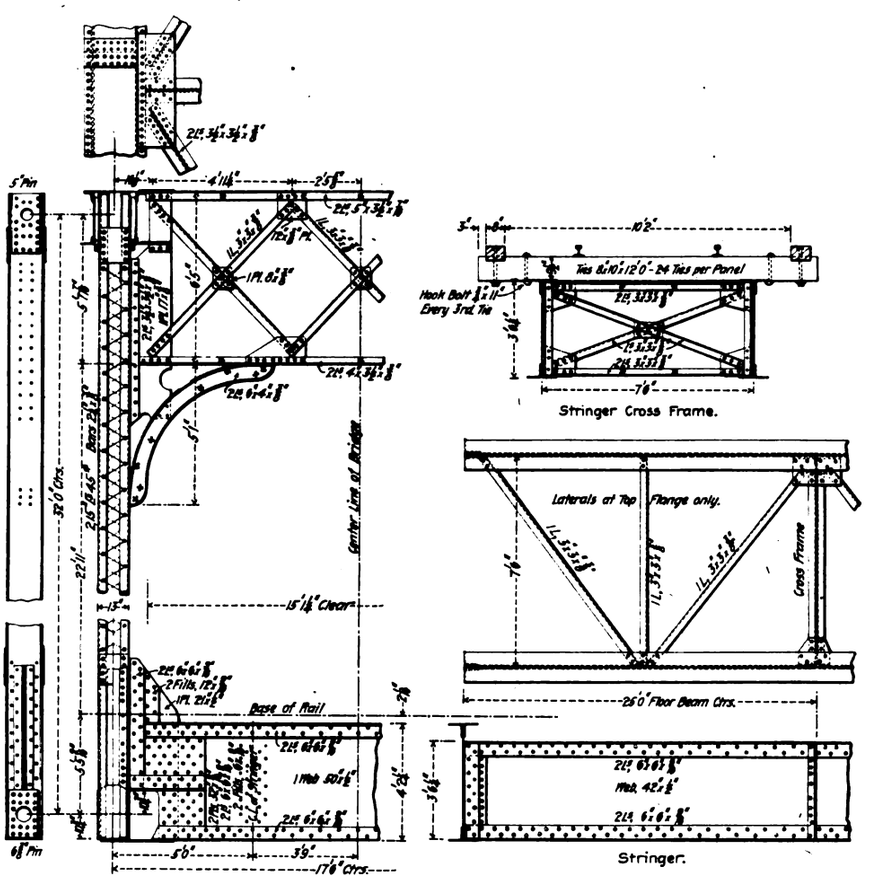
About 275 miles of the railroad are already complete and in operation. The difficulty of building it was largely the result of the inborn conservatism of the Chinese and their dislike of foreign interference. In acquiring the necessary land for the line, the familiar obstacle of the graves of their ancestors being disturbed had to be skillfully met. After a great deal of diplomacy proper compensation was fixed to the satisfaction of the bereaved Chinese. It turned out that the spirits offended by the coming of the foreign railroad had no more objections to raise as soon as any material advantage resulted from the railroad's presence; and ancestor worship yielded to the payment of a regular price per grave. The recent Boxer difficulties also constituted a serious hindrance to railroad building. Native workmen were largely employed, numbering at one time 25,000. The wages paid varied from 10 to 15 cents per day. Cement had to be brought from Europe, as well as the steel and iron used.

Beginning with April, 1901, successive sections of the railroad have been opened to the public. The management of the freight and passenger traffic seems to be skillful, and an increasing amount of business being done, though the difficulties to be contended with are very great. For instance, a system of agencies has had to be established as go-betweens between the railroad and the public. The province which the railroad traverses is half as large as the kingdom of Prussia, the size of its population twice as great. The railroad forms the only means of ready communication with the interior. Much is hoped from the prospective traffic in petroleum, cotton, iron and rice. Eventually the road is to be connected with the Chinese Railroad System constructed under British auspices.

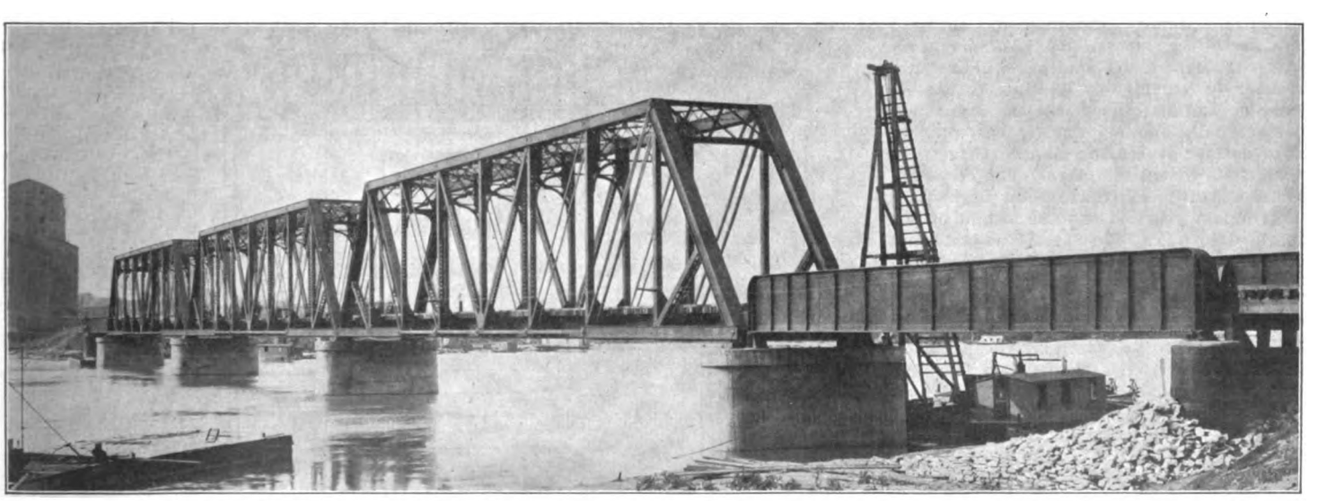
*Condensed from the Journal of German Railroad Directors for June 1, 1904.

Kaw River Bridge of the Chicago Great Western and the Missouri Pacific.

The new bridge across the Kaw River at Kansas City for the joint use of the Chicago Great Western and the Missouri Pacific (Omaha line) was opened to traffic on May 24. This bridge replaces the old bridge of these two companies, which was wrecked in the flood of last year. The old structure was a combination wood and iron affair, with three spans of about 200 ft. each, resting on steel cylinder piers. The entire superstructure was destroyed and the channel piers were overturned. The new bridge occupies a site about 100 ft. north of the old one, there being two reasons for the change: Primarily the location was a better one in relation to the yards and terminals of the Great Western on both sides of the river, and, secondly, it avoided tearing out the abutments and other remains of the substructure of the old bridge. The new structure consists of three through pin-connected truss river spans 200 ft. long center to center of end pins, and a through plate-girder span at each end 80 ft. 1⅛ in. long, all on concrete piers. Piers 1 and 6, supporting the land ends of the girder spans, are steel cylinder piers on piling foundations, with concrete filling. The specifications required the piling to be driven to a depth of not less than 18 ft. below the bottom of the cylinder and to be cut off 16 ft. above the bottom. The sand inside the cylinders was required to be excavated so as to have a depth of not more



Details of Kaw River Bridge.



Kaw River Bridge, Chicago Great Western and Missouri Pacific, at Kansas City.

than 6 ft. above the bottom of the cylinder after the piles were driven.

In the original plans the foundations of piers 2 and 5 were to have been of the same design, namely, an open caisson with piles driven inside, and filled with concrete. But in sinking the caisson for No. 2, instead of the river silt which the soundings had indicated at that point, an old stone dyke 6 in. thick was encountered about 15 ft. below the surface of the water. Finding it impossible to get through this with the dredging apparatus on hand, the caisson was finally sunk to position by putting on a roof and employing the pneumatic process. The roof was then removed and the piles driven and concrete placed according to specifications. With pier 5, owing to difficulties encountered in sinking the open caisson and the shortness of the time remaining for the completion of the work, the contractor concluded to sink this

Portal View, Kaw River Bridge.

pier also with a pneumatic caisson and it was carried down to bed rock.

Channel piers 3 and 4 were sunk by pneumatic caissons to bed rock. During the sinking of No. 4 a corner of the caisson had to be cut through the iron span of an up-river bridge which was wrecked by the flood. The metal was encountered in the loose silt a few feet below the bottom of the river, in about 20 ft. of water, and considerable difficulty was experienced and time consumed in getting through.

The superstructure is designed for a load of two 154-ton consolidation engines followed by a train load of 4,000 lbs. per lin. ft. of track. However, parts of the floor system which are especially affected by concentrated loads have been made about 25 per cent. heavier than the above loading would require in order to provide for possible future increase in loading. Otherwise the design follows generally adopted lines in the working out of details, presenting no special features to which to direct attention. The elevation of base of rail is 2.3 ft. above the high-water mark of last year. The total weight of the superstructure is 1,673,000 lbs. The last truss was swung from the false work on March 24 and the first train crossed 60 days later.

The bridge was designed and built for the joint owners by the Chicago Great Western. The substructure was built by the Kahman-McMurray Company, Kansas City. The steel work was furnished by the Pennsylvania Steel Company, and was erected by the Missouri Valley Bridge & Iron Company, Leavenworth, Kan.

We are indebted to Mr. A. Munster, Acting Chief Engineer, for blueprints and information.

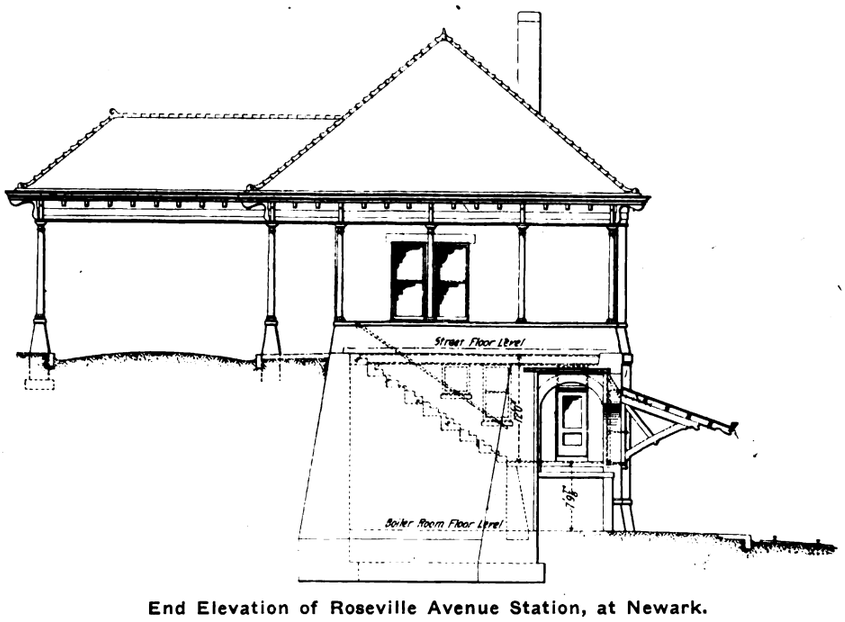
New Station of the Lackawanna at Roseville Avenue, Newark.

In the description of the D., L. & W. improvements and change of grade on the Morris & Essex Division through Newark, N. J., which was given in the *Railroad Gazette*, November 25, 1903, mention was made of the new station which was to be built at Rosevile avenue, and one of the illustrations showed the concrete retaining walls of the excavation in which the station will stand. From High street, about a mile west of the new Broad street station, the tracks are depressed in a concrete walled cut with overhead street bridges, and this depression continues out to the city limits of Newark. At Roseville avenue, the double-tracked Montclair branch turns off to the north and the M. & E. division continues on west with three tracks, one being used for express trains. The old station, which was a frame building, stood on the street level in the apex of the angle formed by the main line and the Montclair branch. The new station building, however, will be located on the eastbound track of the Montclair branch, about 400 ft. from the junction and the train platform running in front of it extends down to the angle formed by the retaining walls of the cut and around the corner along the westbound track of the main line. There is no shelter over the westbound platform of the Montclair branch, but a large enclosed shelter house will be built for the eastbound platform of the main line. Two stairways from each of the three isolated platforms give access from and exit to the street.

The station building, which is of brick, two stories high, is 103 ft. long and 30 ft. 6 in. wide. The platforms at the track level are 19 ft. below the surface of the street, and only one story of the building projects above ground. On the main floor, which is at the street level, are the main waiting room and ticket office, which occupy the center of the building, with the baggage room and ladies' waiting-room and toilet at either end. The entrance is from the plaza formed by Seventh avenue and North Ninth street, through three doors in the center of building. A covered portico shelters the entrance over the driveway and a canopy roof, supported on columns, extends around the three sides of the station. Broad covered stairways lead down to the train platforms at each end on the outside and two stairways lead down from the waiting-room on the street level to the other waiting-room on the lower floor. In the center of this room is the news stand, and leading off from the lower landing of one of the stairways is the men's waiting-room and toilet, which is located just below the ladies' room on the floor above. Under the baggage room is a storage room and shaft for the elevator which connects with the baggage room above. The back part of this lower floor is lighted and ventilated from two broad light wells or areaways built in the back wall. A canopy roof supported on brackets built in the wall of the building shelters the train platform in front of the station. Passengers taking trains either westbound on the Montclair branch or eastbound on the main line will purchase tickets in the waiting-room on the ground floor of the station and then walk over to the stairways leading down to these platforms from Seventh avenue and Roseville avenue.

Work on the retaining walls for the depressed tracks is nearly completed for their entire length, and the station is now in course of construction. It is expected to have the tracks in on the low level and the station ready for use before the end of this year.

We are indebted to Mr. Lincoln Bush, Chief Engineer, for the drawings.



End Elevation of Roseville Avenue Station, at Newark.

History of the Railroad in the German Protectorate in China.*

It will be remembered that the German-Chinese Treaty of March, 1898, followed by the concession of June, 1899, provided for building a railroad in the province of Shan Tung. This railroad was planned to extend from Tsing Tow to Tsin Anfow, the capital of the province of Shan Tung. Branch lines were also provided for. The railroad system is to extend 800 miles in the shape of an equilateral triangle, which will surround the mountainous interior, while the railroad itself will run through partly hilly and partly flat country, densely populated and very fruitful. The population is almost exclusively agricultural, which fact would point to an important passenger and freight traffic in the future. The line also intersects several of the largest coal fields.

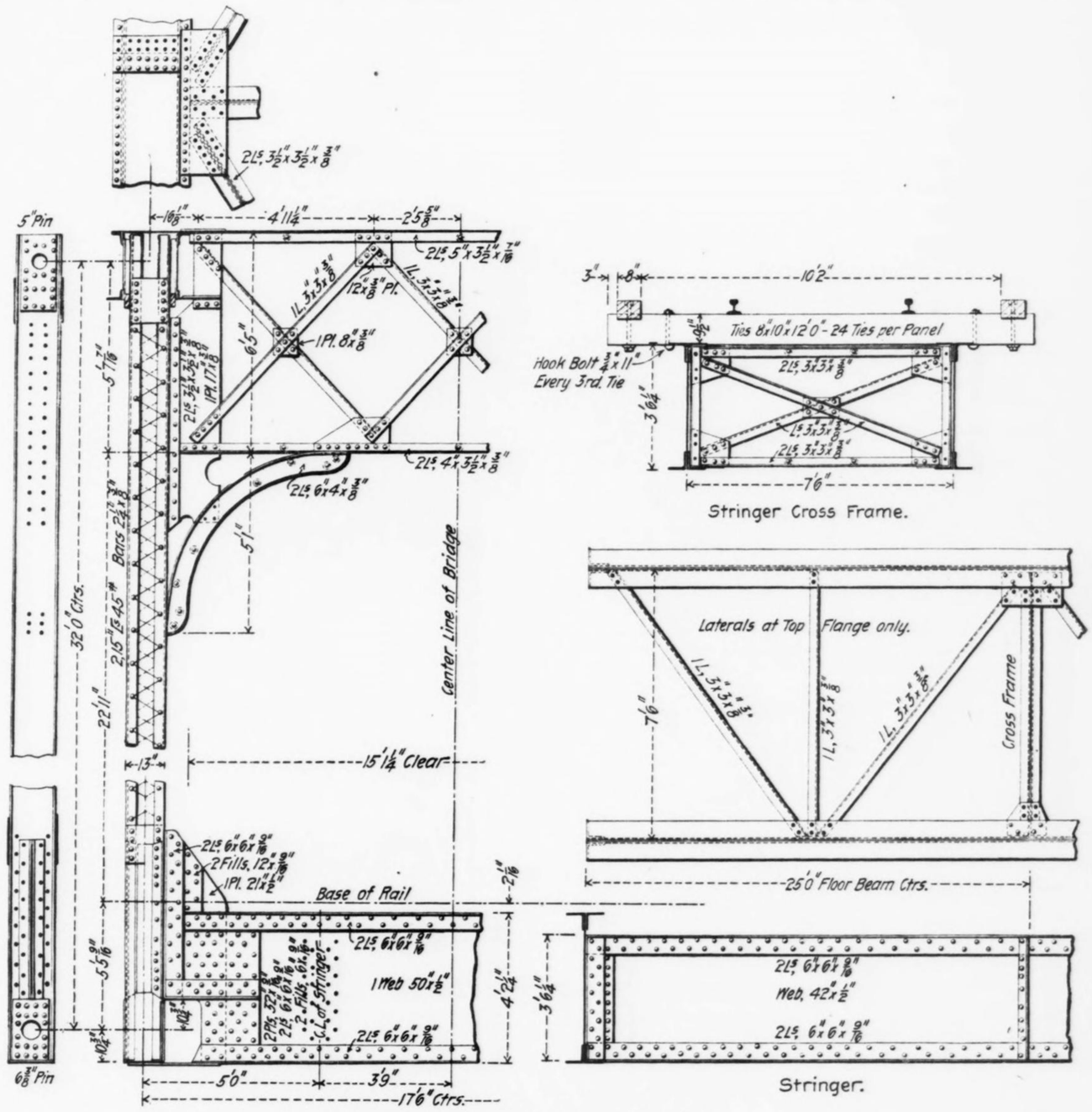
About 275 miles of the railroad are already complete and in operation. The difficulty of building it was largely the result of the inborn conservatism of the Chinese and their dislike of foreign interference. In acquiring the necessary land for the line, the familiar obstacle of the graves of their ancestors being disturbed had to be skillfully met. After a great deal of diplomacy proper compensation was fixed to the satisfaction of the bereaved Chinese. It turned out that the spirits offended by the coming of the foreign railroad had no more objections to raise as soon as any material advantage resulted from the railroad's presence; and ancestor worship yielded to the payment of a regular price per grave. The recent Boxer difficulties also constituted a serious hindrance to railroad building. Native workmen were largely employed, numbering at one time 25,000. The wages paid varied from 10 to 15 cents per day. Cement had to be brought from Europe, as well as the steel and iron used.

Beginning with April, 1901, successive sections of the railroad have been opened to the public. The management of the freight and passenger traffic seems to be skillful, and an increasing amount of business being done, though the difficulties to be contended with are very great. For instance, a system of agencies has had to be established as go-betweens between the railroad and the public. The province which the railroad traverses is half as large as the kingdom of Prussia, the size of its population twice as great. The railroad forms the only means of ready communication with the interior. Much is hoped from the prospective traffic in petroleum, cotton, iron and rice. Eventually the road is to be connected with the Chinese Railroad System constructed under British auspices.

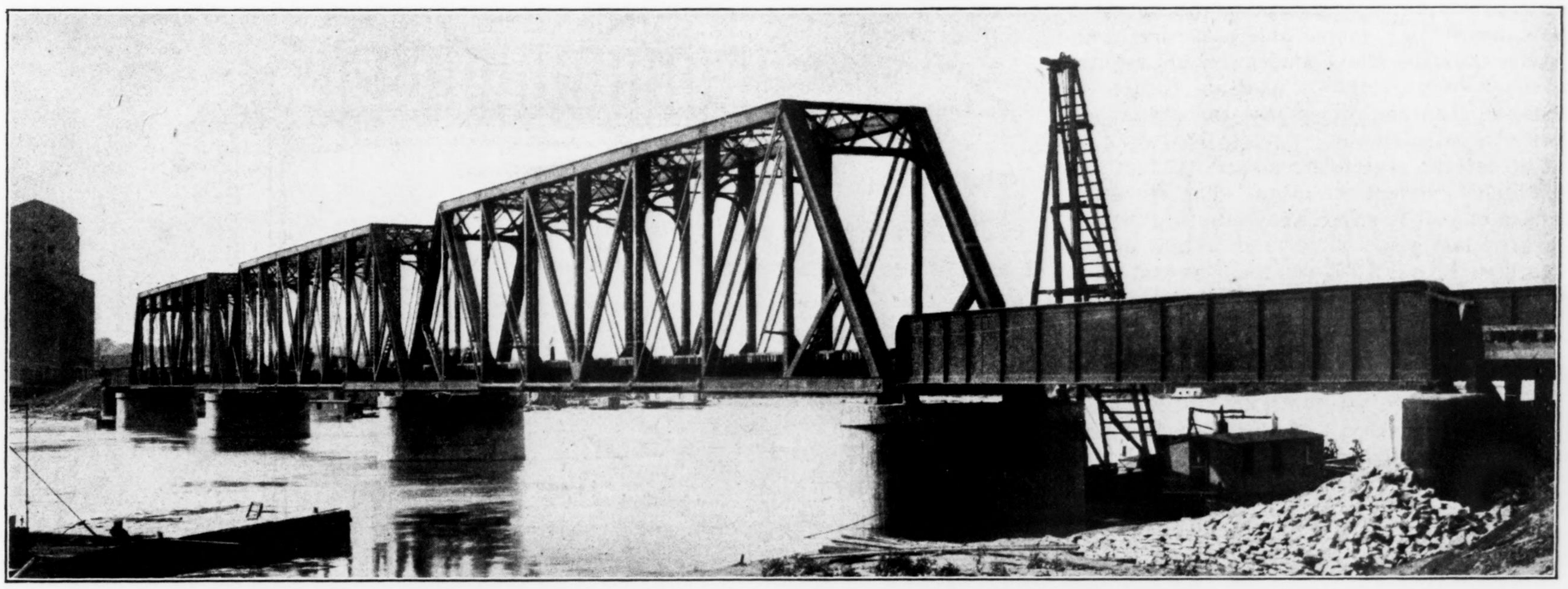
*Condensed from the Journal of German Railroad Directors for June 1, 1904.

Kaw River Bridge of the Chicago Great Western and the Missouri Pacific.

The new bridge across the Kaw River at Kansas City for the joint use of the Chicago Great Western and the Missouri Pacific (Omaha line) was opened to traffic on May 24. This bridge replaces the old bridge of these two companies, which was wrecked in the flood of last year. The old structure was a combination wood and iron affair, with three spans of about 200 ft. each, resting on steel cylinder piers. The entire superstructure was destroyed and the channel piers were overturned. The new bridge occupies a site about 100 ft. north of the old one, there being two reasons for the change: Primarily the location was a better one in relation to the yards and terminals of the Great Western on both sides of the river, and, secondly, it avoided tearing out the abutments and other remains of the substructure of the old bridge. The new structure consists of three through pin-connected truss river spans 200 ft. long center to center of end pins, and a through plate-girder span at each end 80 ft. 1⅛ in. long, all on concrete piers. Piers 1 and 6, supporting the land ends of the girder spans, are steel cylinder piers on piling foundations, with concrete filling. The specifications required the piling to be driven to a depth of not less than 18 ft. below the bottom of the cylinder and to be cut off 16 ft. above the bottom. The sand inside the cylinders was required to be excavated so as to have a depth of not more



Details of Kaw River Bridge.



Kaw River Bridge, Chicago Great Western and Missouri Pacific, at Kansas City.

than 6 ft. above the bottom of the cylinder after the piles were driven.

In the original plans the foundations of piers 2 and 5 were to have been of the same design, namely, an open caisson with piles driven inside, and filled with concrete. But in sinking the caisson for No. 2, instead of the river silt which the soundings had indicated at that point, an old stone dyke 6 in. thick was encountered about 15 ft. below the surface of the water. Finding it impossible to get through this with the dredging apparatus on hand, the caisson was finally sunk to position by putting on a roof and employing the pneumatic process. The roof was then removed and the piles driven and concrete placed according to specifications. With pier 5, owing to difficulties encountered in sinking the open caisson and the shortness of the time remaining for the completion of the work, the contractor concluded to sink this

Portal View, Kaw River Bridge.

pier also with a pneumatic caisson and it was carried down to bed rock.

Channel piers 3 and 4 were sunk by pneumatic caissons to bed rock. During the sinking of No. 4 a corner of the caisson had to be cut through the iron span of an up-river bridge which was wrecked by the flood. The metal was encountered in the loose silt a few feet below the bottom of the river, in about 20 ft. of water, and considerable difficulty was experienced and time consumed in getting through.

The superstructure is designed for a load of two 154-ton consolidation engines followed by a train load of 4,000 lbs. per lin. ft. of track. However, parts of the floor system which are especially affected by concentrated loads have been made about 25 per cent. heavier than the above loading would require in order to provide for possible future increase in loading. Otherwise the design follows generally adopted lines in the working out of details, presenting no special features to which to direct attention. The elevation of base of rail is 2.3 ft. above the high-water mark of last year. The total weight of the superstructure is 1,673,000 lbs. The last truss was swung from the false work on March 24 and the first train crossed 60 days later.

The bridge was designed and built for the joint owners by the Chicago Great Western. The substructure was built by the Kahman-McMurray Company, Kansas City. The steel work was furnished by the Pennsylvania Steel Company, and was erected by the Missouri Valley Bridge & Iron Company, Leavenworth, Kan.

We are indebted to Mr. A. Munster, Acting Chief Engineer, for blueprints and information.

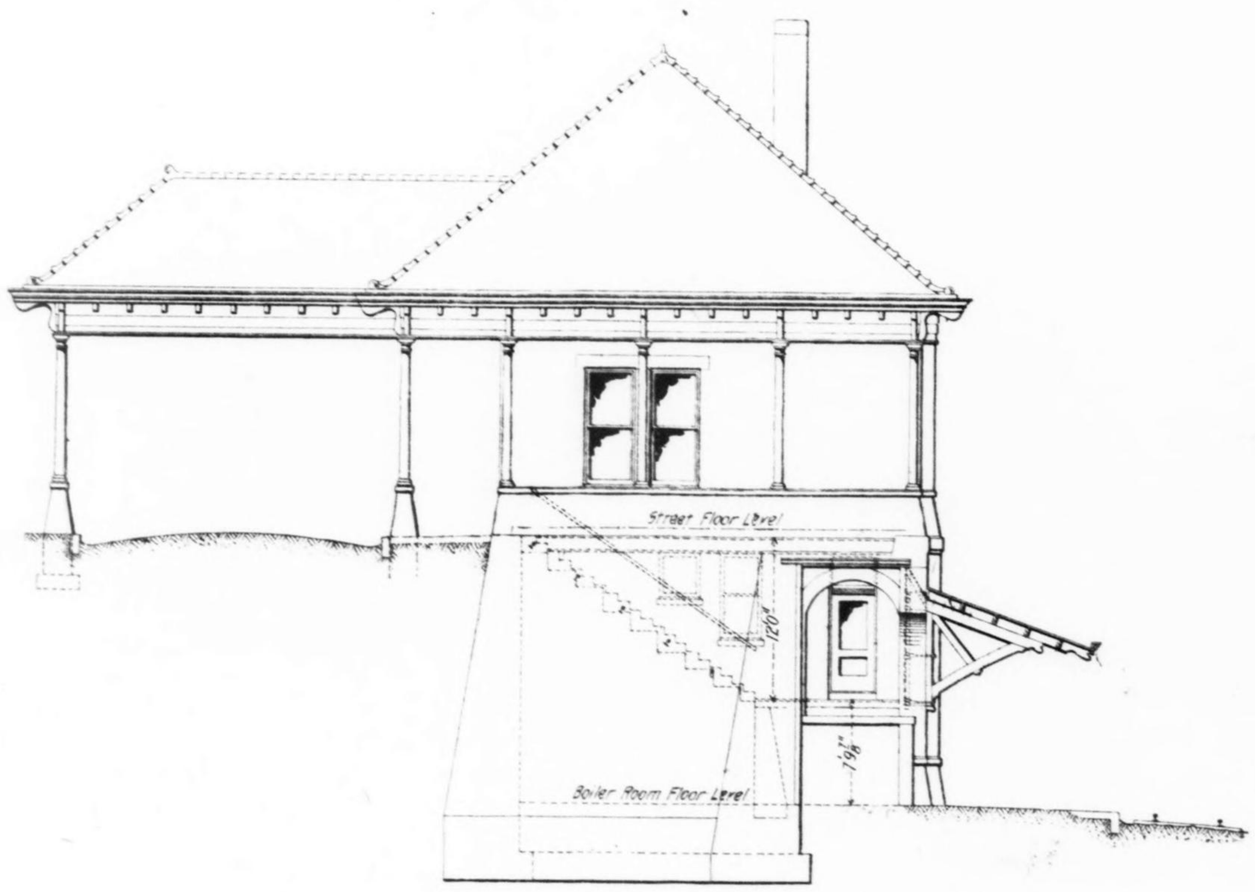
New Station of the Lackawanna at Roseville Avenue, Newark.

In the description of the D., L. & W. improvements and change of grade on the Morris & Essex Division through Newark, N. J., which was given in the *Railroad Gazette*, November 25, 1903, mention was made of the new station which was to be built at Roseville avenue, and one of the illustrations showed the concrete retaining walls of the excavation in which the station will stand. From High street, about a mile west of the new Broad street station, the tracks are depressed in a concrete walled cut with overhead street bridges, and this depression continues out to the city limits of Newark. At Roseville avenue, the double-tracked Montclair branch turns off to the north and the M. & E. division continues on west with three tracks, one being used for express trains. The old station, which was a frame building, stood on the street level in the apex of the angle formed by the main line and the Montclair branch. The new station building, however, will be located on the eastbound track of the Montclair branch, about 400 ft. from the junction and the train platform running in front of it extends down to the angle formed by the retaining walls of the cut and around the corner along the westbound track of the main line. There is no shelter over the westbound platform of the Montclair branch, but a large enclosed shelter house will be built for the eastbound platform of the main line. Two stairways from each of the three isolated platforms give access from and exit to the street.

The station building, which is of brick, two stories high, is 103 ft. long and 30 ft. 6 in. wide. The platforms at the track level are 19 ft. below the surface of the street, and only one story of the building projects above ground. On the main floor, which is at the street level, are the main waiting room and ticket office, which occupy the center of the building, with the baggage room and ladies' waiting-room and toilet at either end. The entrance is from the plaza formed by Seventh avenue and North Ninth street, through three doors in the center of building. A covered portico shelters the entrance over the driveway and a canopy roof, supported on columns, extends around the three sides of the station. Broad covered stairways lead down to the train platforms at each end on the outside and two stairways lead down from the waiting-room on the street level to the other waiting-room on the lower floor. In the center of this room is the news stand, and leading off from the lower landing of one of the stairways is the men's waiting-room and toilet, which is located just below the ladies' room on the floor above. Under the baggage room is a storage room and shaft for the elevator which connects with the baggage room above. The back part of this lower floor is lighted and ventilated from two broad light wells or areaways built in the back wall. A canopy roof supported on brackets built in the wall of the building shelters the train platform in front of the station. Passengers taking trains either westbound on the Montclair branch or eastbound on the main line will purchase tickets in the waiting-room on the ground floor of the station and then walk over to the stairways leading down to these platforms from Seventh avenue and Roseville avenue.

Work on the retaining walls for the depressed tracks is nearly completed for their entire length, and the station is now in course of construction. It is expected to have the tracks in on the low level and the station ready for use before the end of this year.

We are indebted to Mr. Lincoln Bush, Chief Engineer, for the drawings.



End Elevation of Roseville Avenue Station, at Newark.