The New Michigan Central Yard at Detroit

Design and Construction of a 5,500-Car Classification Yard to Be the Third Operated by This Company in Detroit

Although the Michigan Central already operates two yards in Detroit and one just across the river in Windsor, Ont., for the collection, classification and distribution of freight, the company has pushed with unusual speed during the past year the construction of a new classification yard at West Detroit with a capacity of about 5,500 cars. Before the construction of the Detroit river tunnel connecting Detroit with Windsor, very little main line classification was handled here on account of the lack of yard facilities, although the fact that the Bay City and the Toledo branches connect with the main line at Detroit makes this a natural point for such classification. The plans for the improvements made in connection with the building of the tunnel included a classification yard with a capacity of about 3,500 cars on the Windsor side, this location being adopted on account of the impracticability of securing property for a yard in the industrial district along the main line between the Detroit portal of the river tunnel and Bay City junction, where the line branches. A description of the Windsor yard was published in the *Railway Age Gazette* of August 18, 1911. The River Rouge yard on the Toledo division and the North yard on the Bay City line, both of comparatively small capacity, help materially to relieve the congestion in the Windsor yard by handling most of the local business for the branches on which they are located, but the amount of business originating in the industrial district of Detroit has increased so rapidly that none of the roads serving the city have been able to develop fast enough their facilities for handling it.

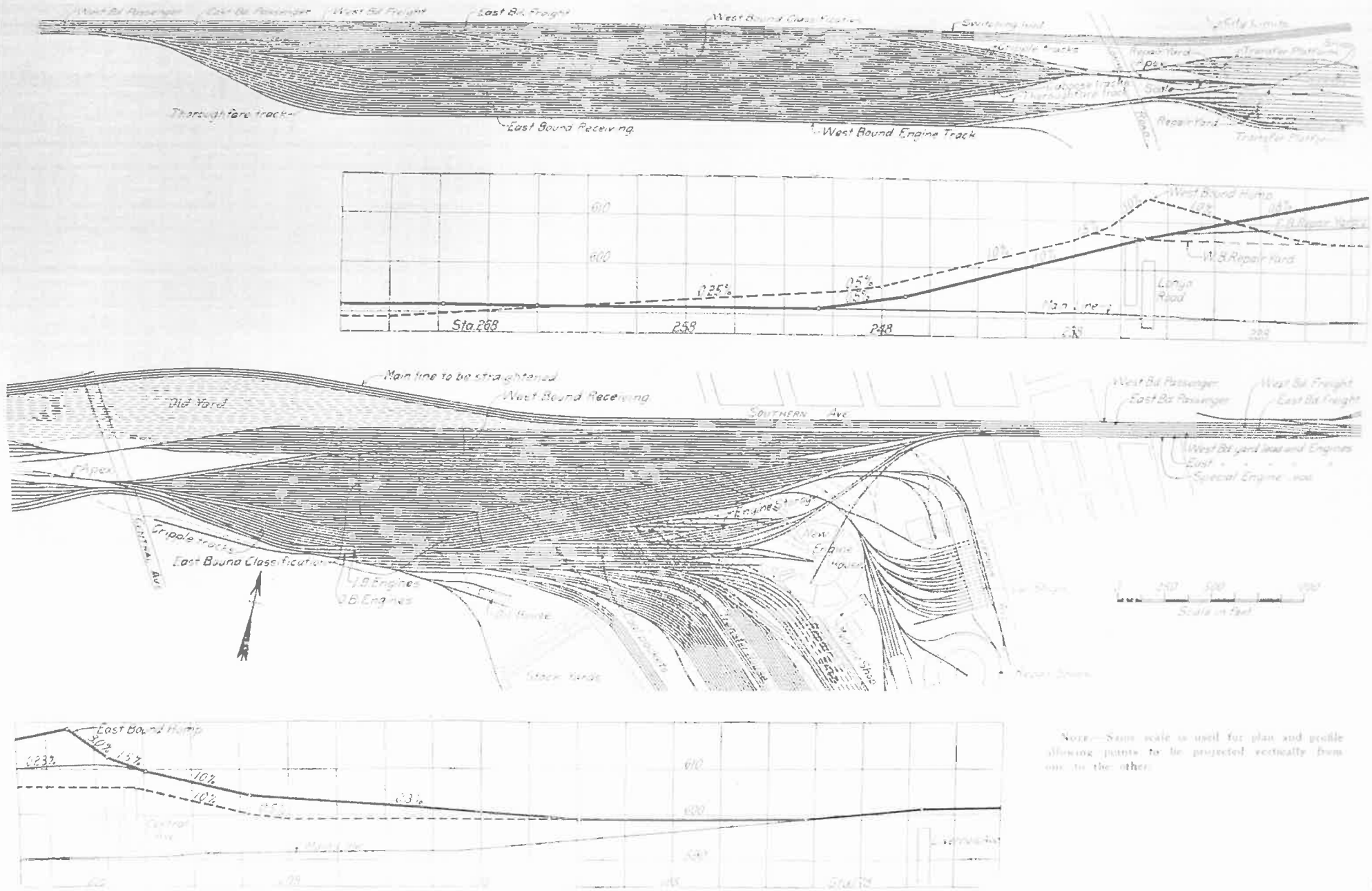
While the necessity for added yard room in properly handling this local business was the most important factor in the decision to build a new yard in West Detroit, the capacity and arrangement of this yard was designed to handle a large amount of main line classification so as to still further relieve the Windsor yard. A very small yard had been operated west of Bay City junction on the main line, and as the location was well suited to the purpose for which the new yard was needed, the same site with the necessary additional property has been used. The location is very favorable for relieving the local situation on account of the fact that the new outer belt line, owned jointly by the Michigan Central, the Grand Trunk and the Lake Shore and operated by the Detroit Terminal, crosses the Michigan Central main line just west of the west end of the new yard and will serve to bring directly to the yard a large amount of the freight originating along the belt line and will also furnish a short connection with the River Rouge yard. As an indication of the amount of freight which originates in Detroit, the Michigan Central requires 95 switching crews every 24 hours to deliver empty cars and pick up loaded ones from the industries along its various lines in the city.

ARRANGEMENT OF YARD

The new yard is located entirely to the south of the four-track main line which will be straightened to eliminate a curve that was necessary to carry it around the old yard. The arrangement is extremely compact. The property occupied by the yard has an extreme length of 2.1 miles and includes about 75 acres. The classification and receiving yards for opposite directions are placed side by side in the usual manner with the two humps next together between the two groups. The space alongside the humps is occupied by repair tracks and a complete engine terminal is located at the east end of the yard. Large car shops adjoin this engine terminal, although these were not a part of the yard development. The old engine house at this location was replaced by a new one immediately previous to the construction work on the yard.

General View of Yard Under Construction, Looking West From the New Coaling Station

The westbound receiving yard has 10 tracks with a total capacity of 792 cars and is divided near the middle by two sets of crossovers to allow a larger number of short drags from local industries to be pulled in and pushed over the hump separately if necessary. The westbound classification yard has 25 tracks with a total capacity of 2,231 cars. In order to provide for the large number of classifications of westbound business that are necessary, without further widening the yard, 14 of the 25 tracks are cut by two parallel and adjacent ladders, dividing these tracks into lengths of about 50 and 80 cars capacity, respectively. The eastbound receiving yard has nine tracks with a total capacity of 865 cars. The design of this yard provided for two sets of crossovers similar to those in the westbound receiving yard, but these were not built. The east-



Plan and Profile of the New Yard Showing Also Location of Old Tracks in the East Half

Note—Same scale is used for plan and profile allowing points to be projected vertically from one to the other.

bound classification yard has 33 tracks with a total capacity of 1,670 cars, these tracks being arranged on three ladders leading from the hump in order to utilize the available space to the best advantage.

The grades over the humps have been fixed from experience gained in operating the Windsor and the River Rouge yards, the accelerating grade having been made 3 per cent. as compared with 2.5 per cent. in the Windsor yard. The 200 ft. of 3 per cent. grade at the top of the hump is followed by 200 ft. of 1.5 per cent. and then about 500 ft. of 1 per cent. grade. The remainder of the eastbound yard is on a 0.3 per cent. or a flat grade and 0.25 per cent. and flat grades are used in the remainder of the westbound yard. The receiving yards are level through the greater part of their length, the approach grades to the hump being 0.8 per cent. and 1 per cent., the choice being principally governed by the necessity for providing clearance over Central avenue and Lonyo road. The type of hump engine to be used on these grades has not been definitely decided, although it will probably be either a decapod similar to the ones used in the Windsor yard, or a Mallet.

The complete yard contains about 73 miles of track and 374 switches. All crossovers and frogs are No. 9 with a ladder angle of 9 deg. 42 min., except in two cases at the outbound end of yards, where 9 deg. 1 min. is used. Manganese frogs and Ajax manganese guard rails are standard. The space between tracks in the yards is generally 13 ft. and 15 ft. alternately, with wider spaces in some cases along thoroughfare tracks and the leads to the engine terminal. The yard tracks are laid with second hand 80-lb. rail on oak ties with gravel ballast. The yard is lighted with flaming arc lights. Track scales will be provided in the classification yards on independent tracks with level grades.

ENGINE TERMINAL

The layout of the engine terminal is very complete and convenient. An ample number of thoroughfare tracks and engine leads are provided throughout the yard to facilitate the movement of engines between the yards and the engine house and two inbound and two outbound leads are provided through the engine terminal. This terminal is designed to handle about 150 locomotives per day. The house contains 43 stalls 90 ft. deep and is provided with an 85-ft. turntable. The building is electric lighted and its equipment includes a National boiler washout system.

A new coaling plant has been built to replace an old trestle plant. The new station is of the Link Belt type, having a storage capacity of 600 tons and a hoisting capacity of 100 tons per hour. The hoist is electrically driven. The plant is of frame and steel construction, provision being made to coal locomotives on four tracks. Steel pockets for dry sand are carried on the sides of the bins over all four tracks.

The clinker pits are located under the two inbound engine leads with a depressed track for ash cars between them. Each pit is 200 ft. long. The water supply for the terminal is secured from the city mains and stored in three tanks, one with a capacity of 50,000 gal. being located near Central avenue, one of 100,000 gal. at the west end of the yard and one of 100,000 gal. at the engine house. Penstocks are provided at convenient points along all engine leads. The track layout of the engine terminal includes two engine storage yards with a total capacity of 30 engines in addition to tracks for wrecker, snow plows, ash and coal cars, etc.

In addition to the main classification yards, the complete development includes a number of minor yards and numerous transfer and shop leads. In the eastbound classification yard provision is made for 33 bad order cars and in the westbound yard for 27. All heavy repairs will be made in the car shops, adjacent to the east end of the yard. The three caboose tracks located along the westbound classification yard have a capacity of 26 cabooses. The two repair yards alongside the humps have a combined capacity of 218 cars, each yard being provided with a shop and a transfer platform, the latter accommodating 11 cars on each side. A 40,000-ton ice house for icing refrigerator cars in transit has been built to replace two old houses which will be torn down.

CONSTRUCTION

The new yard is laid entirely on fill, which required approximately 1,300,000 cu. yd. The material used was clay which was hauled from two pits, one located just west of Ypsilanti, about 27 miles, and one west of Ann Arbor, about 37 miles from the new yard. As it was essential that the work be pushed as fast as possible, the company operated two shovels in the Ann Arbor pit on both night and day shifts and the contractor who excavated and loaded the material in the Ypsilanti pit also used two shovels and worked night and day shifts. The material from the Ann Arbor pit was handled in 200 Rodger ballast cars and a variable number of flat cars. The Rodger ballast cars were loaded with an average of about 30 yd. and the flat cars with about 12 yd. The contractor used Western air dump cars of 12, 16 and 30-yd. capacity for hauling the material from Ypsilanti. The two pits loaded as many as 17 trains per day, requiring 34 train movements over a line that was already handling a very heavy business. Including these material trains as many as 150 trains a day were sometimes operated over the district between Jackson and Detroit. A force of about 600 men was employed at the yard and as the season was unusually dry it was possible to make a very favorable record. The two outfits were able to place as high as 10,000 yd. of fill per day, the maximum output per month being 25,000 yd. In most cases the tracks were raised on the fill, the maximum depth of fill made by this method being about 28 ft. Some construction trestle was built under the humps.

The work at the east end was very much complicated by the necessity for keeping the old yard in service and keeping open the necessary leads to the engine terminal, car shops, transfer house, stock yards, etc. The leads along the south side of the eastbound classification yard were finished and put in operation before the old yard was disturbed so as to provide an entrance to the transfer house, stock yards and repair shops. The work on the new coaling station and clinker pits was pushed as rapidly as possible to allow the old engine facilities located a short distance north of the new ones to be removed, which in turn would allow the new leads to be put in service. Considerable shifting of the roundhouse leads was required in order to handle this development and during the time required to build the new engine terminal facilities filling operations were concentrated on that part of the classification yard west of the old leads. The accompanying photograph, which was taken from the top of the new coaling station looking west, shows the tracks laid in the eastbound classification yard as far as this new fill had been completed. With the new engine terminal in service, practically all of the necessary leads can be carried through and south of the terminal so as to allow the remainder of the classification yard and the westbound receiving yard to be finished.

The construction of the yard involved the separation of grades at two street crossings, Central avenue and Lonyo road, both of which cross under the hump approaches. Two structures are required for the yard tracks at each street. The approach to the westbound hump is carried over Central avenue on a single track structure and the leads from the eastbound hump to the classification yard are carried over that street on a seven-track structure. As the street is only 60 ft. wide, columns were provided on the curb lines only. The piers and abutments are of reinforced concrete, the pier caps and the deck being of I beams encased in concrete. Two double-track bridges are required over Lonyo road, these bridges having both curb and center piers, as the street is 66 ft. wide. The type of construction is the same as the Central avenue bridges. About 4,000 cu. yd. of concrete was required for these bridges. The only other important concrete work in the yard was the extension of a 16-ft. reinforced concrete arch culvert carrying Baby creek under the yard. This required about 3,800 yd. of concrete.

The work on the new yard was started about April, 1913. The engine terminal and about 95 per cent. of the filling had been completed up to December 1. A portion of the grading work was handled under contract by J. R. Patton, Chicago, and the construction of the two bridges and the Baby creek culvert was let to the Engineering & Construction Company, Cleveland. This work was handled under the direction of G. H. Webb, chief engineer, and J. F. Deimling, formerly engineer of construction and later assistant chief engineer.

QUICK TRANSFERENCE OF SIGNAL BRIDGES

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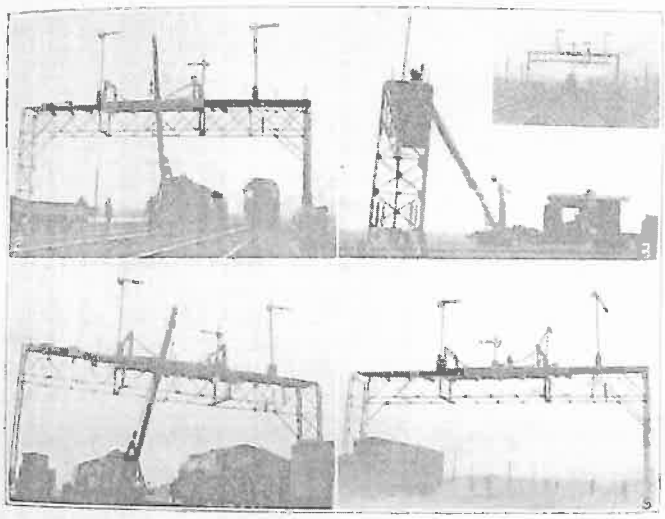
In the transition from the lock and block system of signaling to the automatic system on the New York Central and Hudson River four-track system, it became necessary to relocate several signal bridges. Many of these bridges had been in use since the original installation of the lock and block system many years ago, and the operator was located in a small house perched on one end of the bridge. As switches and crossovers were gradually located at more or less regular intervals in the vicinity of these tower bridges, it became desirable to interlock them with each other and with the signals, the houses were removed from the bridges and two-story signal stations were built nearby. The introduction of automatic signals has eliminated many of these signal stations where few or no switches were located and they have in turn been removed.



(1) Bridge in Service at Old Location at 11.15 A. M.
(2) Ready to Move Bridge
(3) Derrick Backing Away with Bridge Swinging
(4) Movement Stopped to Allow Freight Train to Pass
(5) Bridge in Place in New Position, 12.35 P. M.

In locating and spacing the automatic signals it was not possible to utilize the bridges in their old location and it became necessary to move them. Very often it was necessary to change the location of the bridge and the character of the signals simultaneously. At first it was the practice to erect a spare bridge in the new location, place spare signals on it and change the blades at a given time. The released bridge was taken down with a long boom derrick car which lifted off the truss, the posts being guyed, swinging it round parallel with the rails and placing it on cars standing on an adjacent track. The legs were later disconnected from the foundation and loaded. The foundation was wasted.

To reduce the cost, delay and danger to operation by this process, the plan of lifting the bridge bodily, legs, trusses, signals, foundations and all, was successfully tried and has since been frequently used. On account of the age, design and physical condition of some of the bridges, it was thought best to guard against damage due to a reversal of strains in any of the members by the use of temporary trussing, as shown in the illustrations.

The accompanying illustrations show the actual moving of a signal bridge at Canastota, N. Y., and are in general typical. Fig. 1 shows the bridge in the old location with all signals in use and the derrick train arriving at the bridge at 11:15 a. m. Fig 2. was taken at 11:44 a. m. with the derrick set and the hitch made to the bridge ready to lift it as soon as the passenger train passed. Signal No. 3 had been removed temporarily to make room for the derrick. Fig. 3 shows the derrick backing away and carrying the bridge complete. Fig. 4 was taken at 12:10 p. m. and shows the derrick stopped for five minutes with the bridge suspended to allow a freight train to pass. The bridge was lowered in its new position at 12:13 p. m. and the signals on tracks 1 and 4 were returned to service at 12:17 p. m. Fig. 5, taken at 12:35 p. m., shows all signals in service.

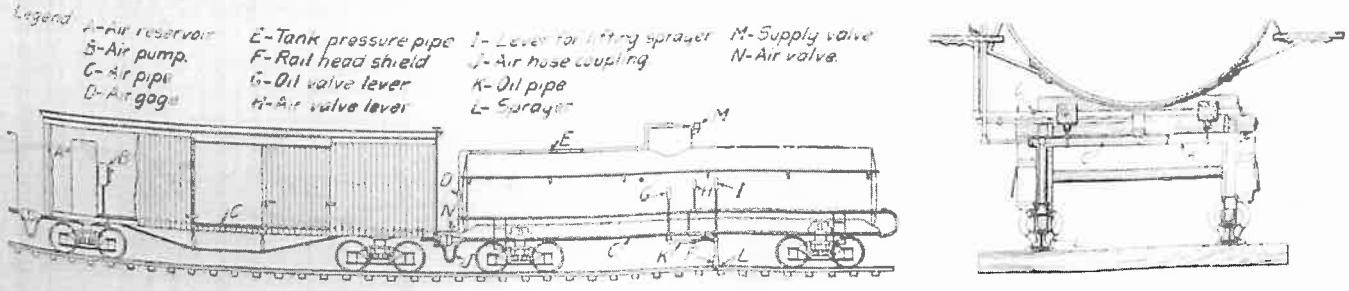
The work was done on March 25, 1912, with moderate weather conditions and with practically no delay to traffic. The bridge was moved 1,282 ft. on tangent in 24 minutes. The signals were out of service on the track on which the derrick worked a total of 51 minutes and on other three tracks 33 minutes.

The cost of changing the location of a signal bridge by this method is about one-fourth that by the other method described, without counting the value of the spare bridge and signals. Bridges have also been carried round curves by running the derrick on the intermediate track nearest the center of the curve to overcome the effect of the superelevation.

A TRACK OILING DEVICE

The Delaware, Lackawanna & Western has been devoting much attention to the proper care of track fastenings. One result of this study is the device illustrated in the accompanying drawing for spraying the fastenings with oil. This consists essentially of a standard oil tank connected to an air flanging machine. The air is stored in large reservoirs and is connected with the oil tank, maintaining in the latter a pressure of from 10 to 20 lb. The spraying device secures its pressure either from the train air line or from the storage tank, working at from 30 to 60 lb. pressure as necessary. The air is conveyed to the spray nozzles by small pipes inside of the regular oil feed pipe. The air and oil are controlled by levers which also enable the spraying nozzles to be raised or lowered as desired.

With this device it has been possible to spray 50 miles of



Elevation and Cross Section of Track Oiling Car on Lackawanna