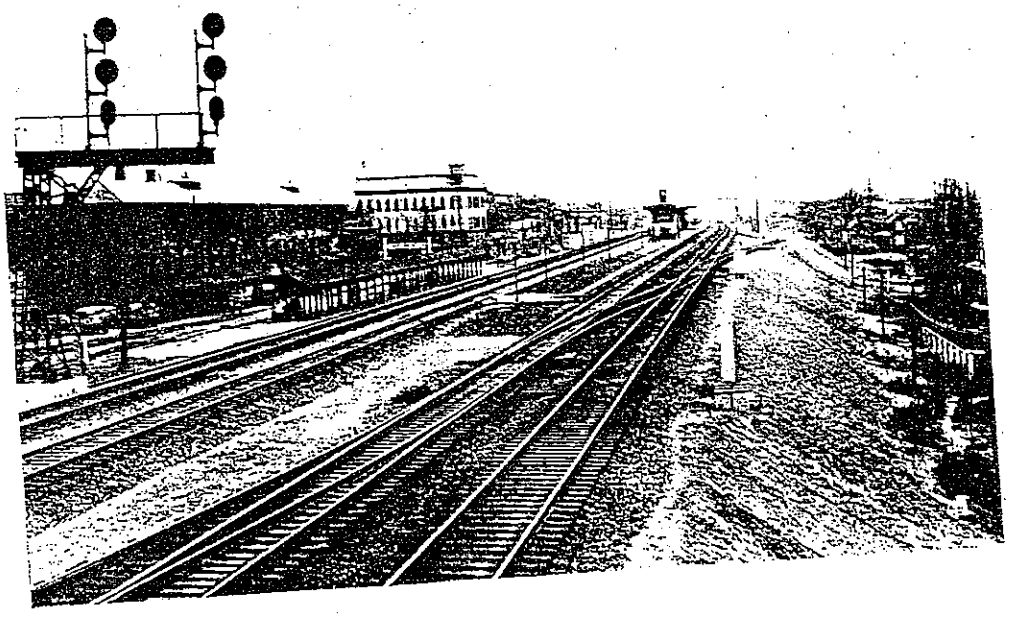
NEW YORK CENTRAL RAILROAD.

NEW YORK CENTRAL SYSTEM

RAILWAY AGE GAZETTE

C. H. RIFF COLLECTION



Looking West Along the Elevated Tracks at Dunkirk, N. Y., Toward the Passenger Platform, Showing the Low-Level Passenger Station at Extreme Left. Photo Courtesy of the Department of Public Works, State of New York

Dunkirk Grade Separation Project Has Interesting Features

New York Central work in Western N. Y. entailed the construction of bridges across seven streets and the elimination of 13 crossings

A GENERAL separation of grades between the streets of Dunkirk, N. Y., and the multiple-track line of the New York Central through that city was recently completed at a cost of about $3,000,000. Accomplished by elevating the tracks for a distance of about 1¾ miles, this project involved the elimination of 13 grade crossings at intersecting streets and also entailed the removal of the tracks from a street that they had occupied longitudinally for a considerable distance. Bridges were constructed to carry the tracks across seven of the intersecting streets, and the remainder were closed to vehicular traffic, although a pedestrian subway was constructed at one of them. Also, the street that was formerly occupied longitudinally, which now flanks the elevated line on one side, was widened and improved, so that adequate provision was made for the movement of cross traffic on this side of the tracks between the closed streets and the subways.

In effecting the separation of grades, the tracks were shifted laterally somewhat, and this necessitated the removal of a considerable number of both private and railroad-owned buildings, the latter including the company's freight house. This structure, and most of the other railroad buildings involved were replaced with new buildings of modern construction. Another complication was introduced by the fact that the New York Central tracks are crossed within the limits of the elevated section by an industrial lead of the Erie, and it was necessary to incorporate this crossing in the elevated layout.

Dunkirk is located 41 miles west of Buffalo on the Central's main line between New York and Chicago. Before the grade-separation project was started, the railroad had four tracks throughout the territory affected, three of which were main tracks (two eastbound and one westbound), while the other was an industrial track serving various industries. Elevation of the tracks made service to industrial sites on the low level impracticable; hence, all four tracks in their elevated position serve as main tracks.

The Situation Prior to Changes

The railroad passes through the city generally in an east-west direction, and in their original location the tracks were located at grade in Third street for about two-thirds of a mile. In addition, a total of 13 streets were crossed at grade, all within a distance of about 1.3 miles, the most easterly of the crossings being at Roberts road and the most westerly at Brigham road (see accompanying drawing). The only intersection in this area at which the grades had previously been separated was at Woodrow avenue, near the westerly end, where a timber overpass carried street traffic across the tracks.

The New York Central uses a station owned by the Erie at Dunkirk, which is located on the south side of the tracks immediately east of Main street. The line of the Erie that is involved here is known as the Dunkirk branch, and extends to a connection with that com-

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pany's main line at Salamanca, N. Y. This line, which now carries freight traffic only, approaches Dunkirk from the southeast and, in reaching the passenger station, it extends along the south side of the New York Central tracks for some distance. Connecting with the main track of the Erie is an industrial lead that serves an important dock area on the north side of the New York Central tracks. This lead gains access to the north side of these latter tracks by means of a series of crossovers located west of Roberts road.

Still another line of railroad enters somewhat into the picture at Dunkirk. This is the Allegheny Valley branch of the New York Central, which extends in a southerly direction from Dunkirk to Titusville, N. Y. The two connections between this line and the main line at Dunkirk embodied a wye track with the east leg connecting with the south yard of the New York Central and the west leg connecting, through the Erie track near the passenger station, with the New York Central southerly main track. This wye was formerly used by the latter road for turning main line locomotives. Incidentally, passenger service over the Allegheny Valley branch was abandoned shortly before work was undertaken on the grade separation project.

Other trackage of the New York Central at Dunkirk includes two yards, both of which are located immediately east of Roberts road. In one of these, the tracks parallel the main line, and this one is known as North yard. The other yard, which is the smaller of the two, is at an angle with the main tracks on their south side, and is known as South yard.

Bridges at Seven Streets

In the grade-separation project, the railroad tracks were elevated on an embankment and, as already mentioned, subways were constructed at seven of the intersecting streets, namely, from east to west, Roberts road, Main street, Park avenue, Washington avenue, Central avenue, Swan street and Brigham road. In addition, a pedestrian subway was built at Robin street. The maximum raise in the grade was 17 ft., at Washington avenue, approximately midway of the elevated section.

Originally the profile of the railroad's tracks through Dunkirk took the form of a slight sag, with descending grades of about 0.3 per cent from both directions. In their elevated positions, the tracks ascend from both directions on grades of 0.3 per cent, with the apex in the vicinity of Main street.

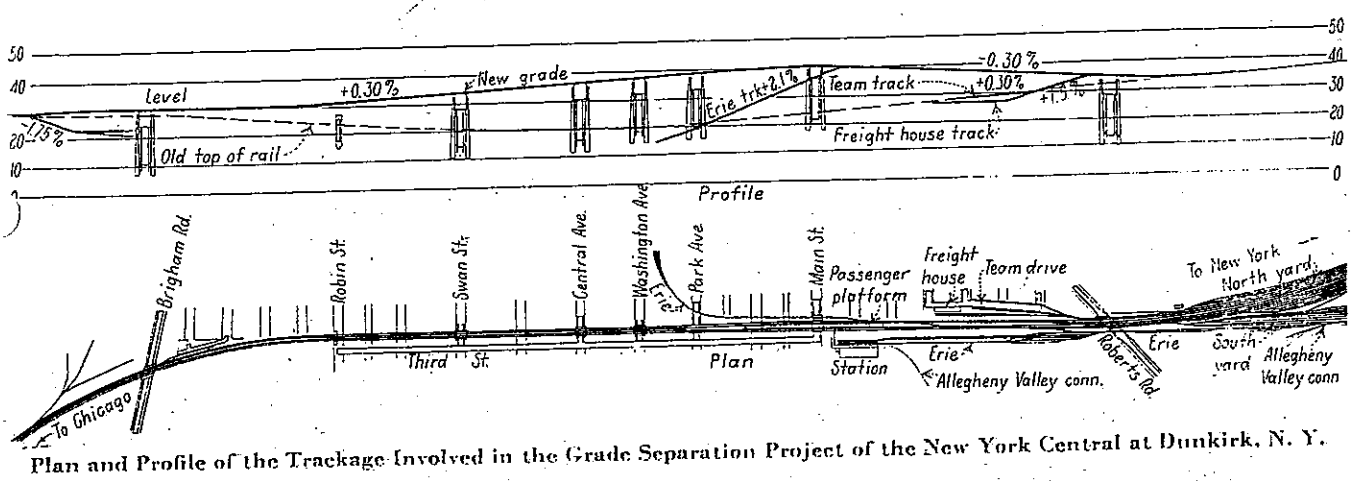
As mentioned previously, the tracks in their original location occupied Third street for a considerable distance, this occupation being such that only a narrow strip of this street along its southerly side was available for vehicular traffic. To improve traffic conditions at the street level, the tracks were shifted laterally to the north sufficiently to vacate the greater part of Third street, permitting this thoroughfare to be improved and widened and incorporated in the new layout as a cross-connection between the streets that lie at right angles to the tracks. In the new arrangement, Third street flanks the railroad embankment on the southerly side from Main street on the east to Robin street on the west, a distance of about two-thirds of a mile. It connects with all the north-south through streets except Roberts road and Brigham road, which are at the extreme opposite ends of the elevated section.

As now improved, Third street has a paved roadway width of 40 ft., with a 12-ft. parking strip, between Main street and Central avenue, and a paved width of 35 ft., with a 17-ft. parking strip, between Central avenue and Robin street, the parking areas being directly adjacent to the railroad embankment.

Precast Cribbing Used

Throughout the length of the improved part of Third street, the adjacent side of the railroad embankment is held behind a retaining wall of precast concrete cribbing, surmounted by a pipe railing in which the posts are set in precast concrete foundation blocks. Elsewhere the embankment has natural slopes except for two comparatively short concrete crib walls on the north side. The slopes above the retaining wall along the Third street side of the embankment are planted with barberry bushes which enhance their appearance.

Since that part of the city that is traversed by the railroad consists of a fairly congested business, industrial and residential district, it was necessary to remove a considerable number of buildings from the area along the north side of the company's property to make way for the tracks in their new alinement. Among the private buildings that it was necessary to remove were a four-story hotel, a large seed packing plant, a bank building, a restaurant, and numerous private dwellings. Also, many railroad buildings were involved, including the freighthouse, whose former location between Park and Washington avenues now lies directly under the four-track elevated line. To replace the abandoned freighthouse, a new structure of modern construction was built at the ground level on the north side of the tracks near the easterly extremity of the elevated section, where it is reached by a lead having a grade of 1.5 per cent.



Plan and Profile of the Trackage Involved in the Grade Separation Project of the New York Central at Dunkirk, N. Y.

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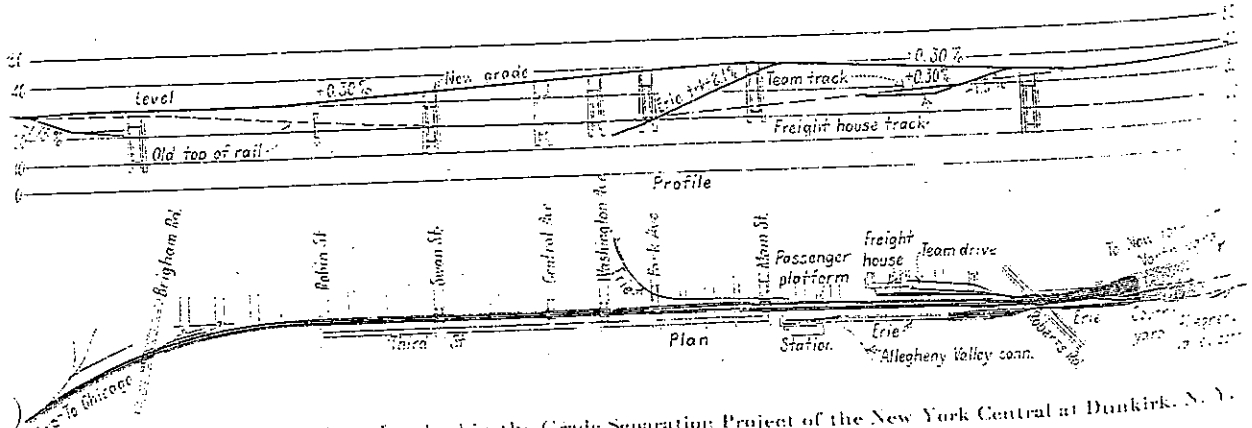

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Other railroad buildings that had to be removed because of the shifting of the tracks included several motor-car houses, a motor-car repair shop, a yard office building, a storehouse, a lumber shed, a carpenter shop, tool houses and offices for the section foreman and signal maintainer, and various lesser structures. Most of these buildings were replaced with new structures, placed for the most part near the easterly end of the project, which are of frame construction with walls and roofs of asbestos-cement shingles. Another facility that was removed was a 50,000-gal. steel water tank, which was replaced with a new steel tank situated a short distance east of Roberts road. Also, because of changes in the Erie's tracks, it became necessary to replace an existing track scale of this company with a new facility at a different location.

Passenger Facilities

Since it is located on the south side of the tracks, it was not necessary to disturb the existing Erie passenger station in carrying out the track-elevation project. For the present, the New York Central is continuing to use this station although it is planned ultimately to replace it with a modern facility, especially adapted to the needs of the elevated layout. For handling passengers at the higher track level, a single island platform was provided between the two center tracks at a point opposite the old station. This platform is reached through a combined passenger and baggage subway, 9 ft. by 20 ft. in cross-section, which is of concrete and steel construction.

The platform, which extends over Main street, is 1,200 ft. long, and for 311 ft. of its length near the center it is protected by a butterfly-type canopy, consisting of steel columns and framing and a roof of precast concrete slabs. A brick headhouse on the platform encloses a baggage elevator and a stairway leading to the subway. At the entrance end of the subway, at the ground level, the opening is located in the center of a short retaining wall, built with bold attractive lines, which gives emphasis to this means of access to the track level.

In order that the passenger platform may be reached by trains operating on the outside tracks, the necessary crossovers were incorporated in the track layout in both directions from the platform. All these crossovers have No. 18 turnouts. The new track layout also includes the necessary crossovers to give the Erie access to its industrial lead on the north side of the elevated line. Situated near the easterly end of the elevated section in the area between the passenger platform and Roberts road, these crossovers extend diagonally across the tracks from southeast to northwest. From its connection with the northerly track of the New York Central the Erie's industrial lead descends to the ground level on a ramp grade of 2.1 per cent. The entire crossover layout described above is incorporated in an interlocking which is controlled by the NX system from a new signal tower located on the north side of the tracks in the vicinity of the new freighthouse. The track work also included the construction of a new wye for turning locomotives to replace the Valley Branch wye, the use of which could not be continued after the tracks had been elevated.

Details of Bridges

The street bridges that were built in connection with this project generally follow conventional practice and are all of very much the same construction. Each of the bridges has a single roadway span and two sidewalk spans. With one exception, the main-line tracks have steel-beam spans which are supported on concrete abutments and steel bents at the curb lines. The decks consist of concrete slabs placed over steel plates laid on top of the beams, and along each side of each bridge there is a steel facia beam surmounted by a pipe railing with cast-iron posts.

Good Vision for Motorists

Generally the bridges have parallel wingwalls, but at the south ends of those subways that connect with Third street, the wingwalls are flared somewhat to give a better angle of vision for motorists. Most of the bridge openings measure 66 ft. between the faces of the abutments and embody a 40-ft. roadway and two 13-ft. sidewalks, although there are a number of minor variations from this rule. Generally the crossings are made substantially at right angles, although the bridges at Roberts road and Brigham road are on moderate skew angles.

The single exception in the main-track bridges to the type of construction described above occurs at the Main Street crossing. In reality there are two double-track bridges here, which are separated by the width of the passenger platform. The bridge on the north side of the platform is similar in construction to the others, but on the south side, where it was necessary to reduce the depth of the bridge deck to a minimum to obtain the desired headroom, the bridge is of through plate-girder construction. Where it extends across Main street, the passenger platform consists of a concrete slab supported by steel beams that span between the near girders of the two bridges. A separate bridge, consisting also of a through plate-girder structure, carries the Erie's industrial lead across Main street.

All of the main-track bridges are four-track structures except the one at Roberts road which carries six tracks—the four main tracks, the freighthouse lead and a yard lead. At the Roberts Road bridge, one of the sidewalks is raised above the roadway level on a fill an amount sufficient to permit a 36-in. sewer line to be carried underneath it. At this end of the bridge, the curb bent consists of a line of concrete columns, although at the other end the usual steel bent is used.

Included in the track layout at Roberts road is the Erie's main line, which, coming in from the east and south, crosses this street and continues on to the Erie station. Immediately west of Roberts road several industrial tracks branch off from this line, including the lead that extends across to the north side of the elevated tracks. As at Main street, a separate bridge, consisting also of a through plate-girder span, was provided to carry the Erie's line across Roberts road.

Construction Procedure

At all of the intermediate subways the separation of grades was achieved largely by means of the track elevation, although at all locations the street grades were depressed to some extent. However, at the two subways near the opposite ends of the project (Roberts road and Brigham road), where the tracks were raised only slightly, it was necessary to obtain the grade separations almost entirely by depressing the street grades.

Because of the lateral displacement of the new tracks, the location of the embankment for nearly the entire length of the project is in the clear of that for the two most southerly of the existing tracks. These two tracks, therefore, were continued in service in their original

locations for handling main-line traffic while the construction work was under way. However, the problem was not so simple where the new and old alinements converged at the extreme ends of the grade change, particularly in view of the fact that there was a grade-separation structure to be built at each of these locations.

Avoiding Hindrance to Traffic

The problem of maintaining traffic was especially acute in the vicinity of Roberts road, where matters were complicated somewhat by the presence of several switching and yard leads and the Erie's main track and industrial lead, in addition to the main tracks of the New York Central.

Here, to permit the Roberts Road bridge to be built in the clear, four temporary detour tracks were built, two for carrying main-line traffic and two switching leads, one of which was used by both the New York Central and the Erie. Because of the necessity of maintaining a connection at all times with the Erie's industrial lead extending to the dock area, and of keeping the existing freighthouse of the New York Central in service until the new freighthouse and its track connection could be completed, the construction work at the east end and the shifting of traffic to the high-level tracks were conducted in several stages. In the construction of the Brigham Road underpass at the opposite end of the project, it was necessary to construct only the two main-line detour tracks.

Grading

The grading on this project amounted to about 250,000 cu. yd., and was carried out by a highly-mechanized organization, particular care being taken to assure proper compaction of the embankment. The fill material was obtained largely from a borrow pit, being excavated by crawler shovels and hauled to the site in dump trucks, 20 of which were used. Other grading equipment utilized on this job included a bulldozer, a sheepsfoot roller, a 10-ton roller, and a blade grader.

This project was carried out in accordance with an order issued by the New York State Public Service Commission and under the terms of the state constitutional amendment passed in 1938 which fixed the cost to the railroads of such projects at not more than 15 per cent of the total, the remainder to be borne by the state. While the construction contracts were awarded by the State Department of Public Works, the plans were drawn by the railroad under the general supervision of J. W. Pfau, chief engineer of the New York Central, Lines Buffalo and East. The construction work was supervised jointly by the railroad and the state.

The C. B. Moon Company, Cleveland, Ohio, had the contract for the grading, the bridge substructures and the street work, while William E. Bauley & Co., Auburn, N. Y., constructed the buildings, including the platform canopy and the brick headhouse. The bridge steel was furnished and erected by the Bethlehem Steel Company, and the equipment for the signal system and track interlocking was furnished by the General Railway Signal Company. All track work was performed by company forces.

The project was undertaken on April 8, 1940, when the work of removing the buildings was started, and was completed about July 1 of this year, although the [illegible] tracks had been in operation for several

Derailment Protection

(*Continued from page 441*)

the Lark Pullman cars, appearances would indicate that the truck equalizer functions similarly to the safety guides in a derailment of this kind. The equalizer bar is not attached to the truck by rivets, bolts or other fastenings, but the ends merely rest on top of the journal boxes and it is held there by the weight upon it. It moves up and down with the wheels, whereas the safety guide remains fixed and is therefore more dependable under various conditions.

Results obtained with the Derailment Safety Guides on streamline-type passenger equipment were so successful that we have extended the application of the device to many of the conventional type of passenger cars and also to a number of locomotives and tenders. Some 860 units of rolling stock have now been equipped.

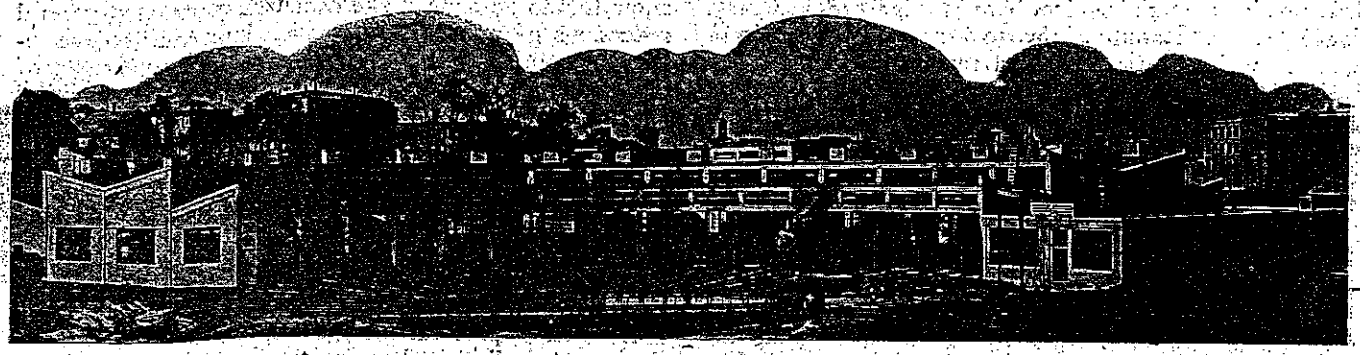
Some of the other applications to various types of equipment are illustrated. In the application to a conventional type six-wheel truck safety clips have been provided, to prevent the guide bar from dropping in event of a lost nut or broken bolt. Also shown is a lug which bears against the back of the pedestal so that when force is exerted on the vertical flange, dependence is not placed entirely on the bolts securing the guide to the pedestals. Ends of the guide are also flanged up against the pedestal.

A short time ago the engine on one of our passenger trains on the Coast route ran over a piece of pipe at a crossing, which caused the engine truck to derail. The train proceeded for a distance of some 900 ft. before being brought to a stop. The usual experience with engine trucks is that they turn crosswise or head away from the track when derailed and result in the engine turning over, or other serious consequences. In this case, however, the safety guide held the truck in line with the track and as a result, no damage was sustained by the engine or other equipment in the train.

Not to be outdone by its brothers on passenger cars and locomotives, the tender safety guide also has proved itself under fire. In this case, which occurred at El Paso, a tender was being moved onto the turntable and due to improper alignment of the table, the tender was derailed. Under ordinary circumstances derailment of this tender in all probability would have caused a considerable delay. But the safety guides with which it was equipped, quickly came to the rescue and held the tender in line with the track so that only the front pair of wheels were derailed and the tender could be rerailed with a minimum loss of time.

We had a derailment in West Oakland yard of two of the Diesel power units from the City of San Francisco. This derailment was caused by a worn switch point and in this case, as in cases involving trailing cars, it was found that the safety guides with which these power units were equipped, lapped over the rail as expected. Notwithstanding the fact that the speed at time of derailment was not more than 10 miles per hour, the lateral force exerted on the tie-bar flanges was sufficient to turn the rail over. The safety guides came through this ordeal with only minor abrasions; however, their work was well done since their action in keeping the power trucks in line with the track assisted materially in rerailing these heavy units.

This small but sturdy newcomer to the field of safety has thus demonstrated its effectiveness under actual derailment conditions on passenger cars, on a steam locomotive, a tender and on Diesel-electric streamliner power units—everywhere that it has been applied.



The New 15-Stall Enginehouse of the Boston & Albany at Worcester

B. & A. Builds Modern Engine Terminal at Worcester, Mass.

New steel-concrete enginehouse has unusual roof design —Cork insulation prevents sweating

IN order to modernize its engine facilities at Worcester, Mass., the Boston & Albany has completely rebuilt its terminal at that point, enlarging the area available for its facilities, rearranging its tracks to provide greater flexibility of operation, and erecting a number of important structures of modern design to expedite the turning, housing and maintenance of locomotives. Of the new facilities provided, the more important include a 15-stall enginehouse, a machine shop, a two-story terminal office, an office, stores and enginemen's building, a power house, a 200-ton coaling and sanding station, and two electrically-operated ash hoists. These facilities, together with the other improvements and changes, involved an expenditure of approximately $600,000. It is estimated that they will effect large savings annually, partly through more efficient operation, and partly through the reorganization of forces which they permit.

The new engine terminal is located on the site of the old facilities at Worcester, in the industrial section of the city, about one-half mile from the passenger station. Serving the main line of the road between Boston and Albany, the terminal handles an average of 55 freight and passenger locomotives daily, which are used regularly in service east to Boston, Mass., and west to Albany, N. Y. In addition the terminal handles the power employed in through freight service to the interchange yard of the New York Central at Selkirk, N. Y.

The new terminal lies in a general north and south direction and is approached from the main line by a single lead track, which also serves outgoing power. At the throat of the terminal the single lead branches out into two main enginehouse leads, one for inbound engines, and the other for outbound power. At a point about 400 ft. from the house these two main leads spread to wide centers and connect with a third or intermediate lead to the turntable, which is designed for the use of both inbound and outbound engines. In addition to these three leads, two other tracks have direct connection to the turntable, one of these being a cinder car track, which serves the ash pits, and the other the coal supply track serving the coaling station. So arranged, either of these latter two tracks can be used as an emergency enginehouse lead if the main leads should become blocked or congested for any reason. The only other track of importance at the terminal is the coal supply track serving the new power plant.

Enginehouse Is of Steel, Concrete and Tile Construction

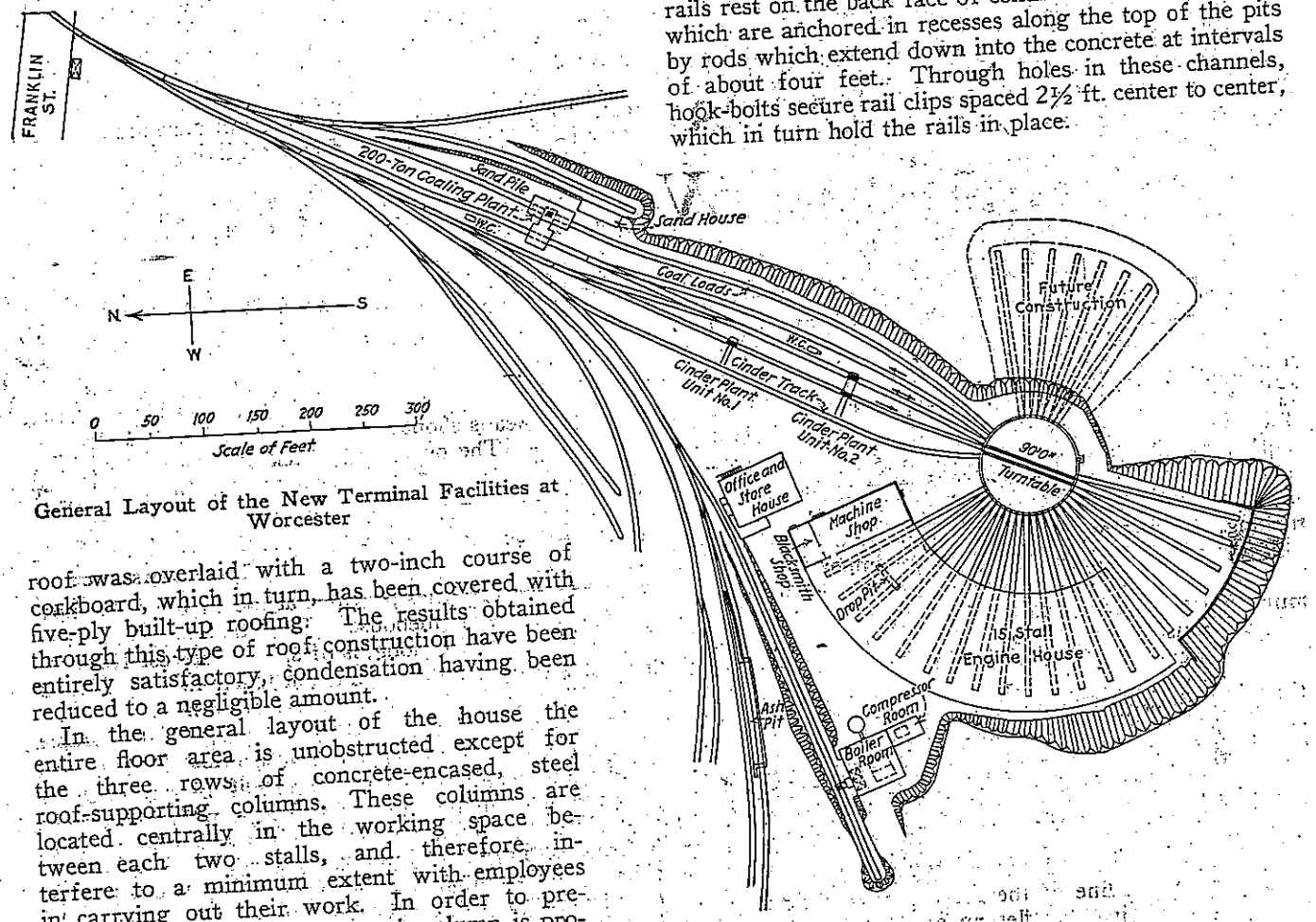
Of the new facilities provided at the terminal the most important is the enginehouse. This structure, which has 15 stalls, each 112 ft. long, is of special interest from the standpoints of both design and construction. It is located at the south end of the terminal, partly on newly excavated land, and partly on the site of the old 12-stall frame roundhouse which was formerly in service at this point.

The new enginehouse, which is built on the arc of a circle, is a tile-walled, steel frame structure with a concrete slab roof, and with all of the steelwork of the roof structure and roof-supporting columns encased in concrete. In designing the enginehouse particular attention was given to the roof structure to secure all of the advantages of concrete construction, and, at the same time provide for maximum daylighting and ventilation. The roof is of the high-low type, the high roof extending around the house over the main central bay, while low roofs form lean-to sections of the house, flanking the main central bay on each side. Both the high and low sections of the roof, contrary to usual enginehouse construction, slope toward the center of the building where water is collected and carried off through cast iron downcomers along the roof-supporting columns. Through this arrangement the smoke and gases which have a tendency to accumulate in the house, have four general avenues of escape, following the upward slopes of the roof to continuous rows of steel sash with center-hung sections, which surround the building at the high points of the roof structure. With this type of roof it is felt that ventilation is not only more complete and rapid than is possible with the conventional monitor-top type, but that better daylighting is effected through the tendency of the roof to reflect the light and to deflect the light rays downward.

In utilizing concrete in the roof structure, primarily to afford fireproof construction and to secure the advantage of reduced radiation, the main problem encountered was to preclude sweating or condensation on the under face of the roof. This was considered of large importance for in certain instances condensation on concrete enginehouse roofs has been so extensive as to keep the floors of the houses wet continually, much to the discomfort and inconvenience of the employees.

Cork Insulation Prevents Roof Sweating

In order to preclude such a condition at the Worcester enginehouse, together with the tendency of the concrete to develop hair cracks where it is exposed to enginehouse condensation, the 3½-in. slab forming the roof was overlaid with a two-inch course of corkboard, which in turn, has been covered with five-ply built-up roofing. The results obtained through this type of roof construction have been entirely satisfactory, condensation having been reduced to a negligible amount.



General Layout of the New Terminal Facilities at Worcester

In the general layout of the house the entire floor area is unobstructed except for the three rows of concrete-encased, steel roof-supporting columns. These columns are located centrally in the working space between each two stalls, and therefore interfere to a minimum extent with employees in carrying out their work. In order to prevent damage near the floor, each column is protected at the base, on all four sides, by steel casing about seven feet high.

The floor of the enginehouse is of concrete throughout, 6 in. thick, consisting of a 5-in. base course of 1-3-6 concrete, and a 1-in. wearing course of 1-3 concrete with Master Builders hardener. The entire floor area is laid on an 8-in. well-tamped cinder fill. The sash throughout the house are of steel and extend over large areas around the outer ring wall, as well as in all vertical faces of the roof structure. All of the ventilating sash are of the center-hung type, regulated by hand chains from the floor. The doors of the house are of the simple-hinged double-swinging type, opening outward against stops between the enginehouse tracks. All of these doors are of wood construction, the upper half in each case being fitted with sectional windows to afford additional daylighting to the house when the doors are closed.

House is Well Equipped

Each of the 15 stalls of the house is equipped with a concrete inspection pit, 85 ft. 6 in. long and varying in depth from 3 ft. at the inner end, to 3 ft. 6 in. at the outer end. In addition to the inspection pits, two of the stalls near one end of the house are equipped with a driver drop pit which is served by a Whiting drop pit table, and one of the pit tracks is fitted with removable spring rails whereby locomotive wheels can be dropped sufficiently to permit the removal and replacement of springs. All of the pits are kept dry by six-inch drains at their inner ends, these being joined together by a 12-in.-10-in. collecting drain which encircles the house.

In order to preclude the spalling and disintegration of the concrete directly beneath the pit track rails, these rails rest on the back face of continuous 12-in. channels, which are anchored in recesses along the top of the pits by rods which extend down into the concrete at intervals of about four feet. Through holes in these channels, hook-bolts secure rail clips spaced 2½ ft. center to center, which in turn hold the rails in place.

In order to prevent the over-running of the pit tracks, the end of each track is equipped with rail chocks, and immediately beyond, each pit is equipped with a pit fall section, which is covered with light planking, this type of construction having been adopted in order to avoid the obstruction and hazard of surface bumpers. As a protection to the house in case of a locomotive over-running and not being stopped by the pit falls, the panels in the outer ring wall directly beyond the ends of the pit tracks, are non-load bearing, and are joined to the roof supporting wall sections by plaster cement. Through this type of construction, a locomotive over-running its pit will cause a minimum of damage to the enginehouse.

The direct smoke exhaust system at the house consists of built-up, sheet asbestos smoke jacks at the head end of each pit track, which collect the direct smoke and gases from standing locomotives and carry them through the

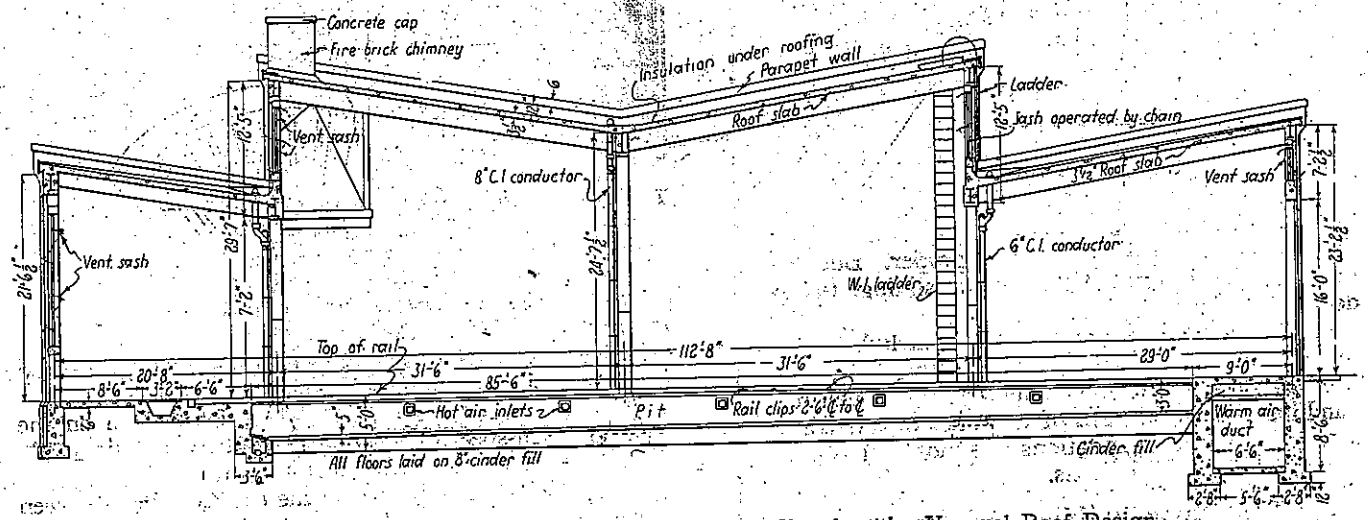
roof. In order to make this system more positive, both sides of each jack are equipped with low-hanging concrete curtains which fit down over the stacks of the locomotives. As no such curtains are provided at the ends of the jacks even the highest locomotive stacks can be spotted under the jacks without difficulty. In addition to this special feature to preclude the escape of smoke and gases into the house, special protected openings have been provided along the sides of each jack where they pass through the roof, to permit the escape of such smoke and gas as may not be caught by the smoke jacks, or as may collect while locomotives are entering or leaving the house. These special features for ventilation are, of course, supplemented by the ventilating sash in the outer ring wall, and along the vertical faces of the roof structure.

The enginehouse is heated by the indirect system, the steam being supplied by the new terminal power house. The steam for the system is received at the machine shop adjacent to the enginehouse, where Sturtevant blower equipment forces clean fresh air through steam coils, and then into a large sub-surface concrete duct which extends around the inner side of the house. This duct has openings along both sides of each inspection pit, connected with auxiliary ducts which carry the heated air into the pits at intervals throughout their length. The capacity of this system is such that it is possible to make six complete changes of the air within the house each hour, and to maintain a temperature as high as 70 deg. F. during even the coldest weather.

Artificial lighting of the house is accomplished entirely by flood lights, two such lights being mounted overhead on the outer circle wall directly in line with the working space between each pair of track pits. These lights, which have a rating of 200 watts, are of the adjustable type and are controlled separately by wall plugs directly beneath them. While these lights afford adequate illumination for all general work about the house, electric outlets are provided at all of the center columns, where connection can be made for extension cord lights and welding.

Service piping throughout the house consists of steam lines, air lines and water lines, steam and air drops being provided at each of the columns at the head end of the pits, and three-inch water connections at the head end columns between alternate pairs of stalls. These drops, together with electric circuit plugs, make it convenient to use either electric or pneumatic tools in any part of the house. The water and steam lines within the house are used primarily in connection with the Nathan boiler tester and filler employed for washout purposes and for making hydrostatic tests.

Special equipment and facilities at the house, other than that already mentioned, include small cast iron work benches equipped with vises and placed between adjacent pits, a portable work bench and outfit, adequate gas welding equipment, and a portable crane truck with a telescoping boom which is used for handling heavy parts on and off locomotives. The work benches provided at each stall are located adjacent to the center row of roof-supporting columns, and to insure adequate light at these points, electric light plugs have been provided in the columns directly above each bench for such lighting as may be necessary. The arc welding outfit mentioned, which was furnished by the U. S. Light & Heat Corporation, can be transported readily to any point within the house, and can be plugged into any one of the welding circuit outlets which have been provided around the outer ring wall, directly beneath the flood lights.



A Typical Section Through the New Enginehouse Showing the Unusual Roof Design

In order to make it possible for mechanics to keep a close check on their tools, and at the same time to minimize the time spent in securing and returning tools to the tool room, each mechanic is provided with a portable, all-welded tool box, on which his number is painted. These boxes are kept in an orderly row along the outer ring wall of the house. The use of these boxes has not only brought about the desired results, but has also made it possible to reduce the size of the tool room required in connection with the enginehouse.

For turning power at the house, a new 90-ft. turntable has been provided which operates within a concrete pit. This table, which was furnished by the American Bridge Company, is of the three-point support, continuous type, operated by an electric motor at each end.

Machine Shop Is a Well Equipped, Fireproof Structure

A new machine shop, approximately 112 ft. long by 40 ft. wide, is located adjacent to the north end of the enginehouse. Like the enginehouse, this unit is a concrete-encased steel frame structure, one story high, with a concrete foundation, a steel and reinforced concrete roof, and tile exterior walls. The roof of the shop, which is supported by the side walls and a center row of encased steel columns, is made up of concrete-encased steel girders which carry a 3½-in. flat roof slab. In

order to provide for drainage, the roof is divided longitudinally into four sections in accordance with the column spacing, and each section has been given a slight pitch toward the columns where cast iron drain pipes carry the water down through the building to a storm sewer. In providing a suitable pitch over each section of the house, cinder concrete was placed on top of the flat roof slabs and covered by five-ply built-up roofing.

The machine shop is divided into four main sections; the machine shop proper, which occupies the central part of the building; a blacksmith shop, which extends across one end; and an air brake room and a fan room, which occupy the other end. In addition to these main sections, separate areas are also provided for a tool room and for charging batteries.

The flooring throughout the building, with the exception of that in the blacksmith shop, is of three-inch creosoted wood blocks supported on a five-inch concrete base, which in turn rests on an eight-inch, well-tamped cinder fill. In the blacksmith shop the flooring consists of 12 in. of rolled cinders.

One of the notable features of the shop is the adequate daylighting and ventilation provided, large areas of fixed steel sash with two rows of center-hung ventilating sash having been provided in each end of the building and along the side opposite the enginehouse. Further ventilation is supplied by ventilators in the roof over the blacksmith shop. The only openings between the enginehouse and the machine shop consist of two large doorways, one 10 ft. wide into the blacksmith shop section, and the other 8 ft. wide into the machine shop proper. Both of these openings are fitted with automatic, sliding, tin-clad fire doors.

The equipment within the shop includes all of the machine tools necessary for the handling of all classes of running repairs, the shop being especially well fitted for handling rod work. All of the machines, which rest on separate concrete foundations, are motor-driven, and are controlled by push buttons.

The Office Building and Power Plant

The new office, storehouse and enginemen's rest building is located just north of the machine shop, and, like that building, is a steel and reinforced concrete structure with tile exterior walls. This building, which is two stories high, is approximately 66 ft. long by 50 ft. wide. In the division of the floor area within the building the first floor is occupied by the general foreman's office, a dispatcher's office, an engine crew's register room, and a locker room and lavatory for the engine house forces, in addition to a room at one end for the storage and distribution of oil. The second floor contains a large rest room, separate wash and locker rooms, and a sleeping room with six single cots for engine crews.

The Well-Lighted Interior of the Enginehouse Showing the Special Smoke Jack Construction

A feature of the engine crews register room on the first floor is a special revolving crew board. This board, which is mounted on center pivots at the ceiling and the floor, revolves in an opening in the partition wall between the dispatchers' office and the register room. Through this arrangement the board can be revolved from either side of the partition, and can thereby be used with facility by either the dispatcher's clerk or the engine crews.

A View From the Coaling Station Overlooking the New Terminal Facilities

Electro-Motive Gas-Electric Motor Car and Trailer on the Cincinnati Northern

Motor Cars Handle Cincinnati Northern Passenger Traffic

Four electro-motive units have demonstrated reliability and economy of operation over a period of 38 months

SINCE September, 1925, all of the passenger trains on the Cincinnati Northern have been operated by gas-electric rail motor cars with the exception of a very small portion of passenger train mileage occasioned by accident, heavy traffic or failure. This proportion, handled by steam locomotives, has actually amounted to less than five per cent of the total scheduled mileage. The Cincinnati Northern was one of the first roads to adopt the modern type of gas-electric unit and is one of the very few roads that handles all of its passenger traffic with this type of equipment.

The road runs in a north and south direction between Cincinnati, Ohio and Jackson, Mich. a distance of 244.1 mi. The passenger service is operated daily, except Sunday. One train leaves each terminal of the road in the morning making the run over the entire length of the road. Two other runs are turn-around runs, one from Van Wert, Ohio, to Jackson and return, a total mileage of 205.4, and the other from Van Wert to Cincinnati and return, a total of 282.8 miles.

Equipment and Operation

The motor cars are combination baggage and mail, having a weight of 83,000 lb., and also are equipped with Electro-Motive Company, 225-hp. gasoline-electric power plants. These cars haul a standard wood day coach as a trailer. The weight of the trailer is 84,000 lb. and the seating capacity 82 persons.

Under steam-locomotive operation eight locomotives were assigned to passenger service. Under present conditions the traffic is handled by four motor trains with one steam locomotive held for emergency service as relief equipment.

An analysis of the operating figures for the first six months of 1928 will furnish a typical illustration of the motor train performance.

Total passenger train mileage		152,356
Total motor train mileage		149,914
Total steam train mileage because of:		
Motor car failures	999	
Freight derailments	488	
Heavy travel	282	
Accidents to motor cars	673	
		2,442

On the basis of the above figures the motor trains accounted for 98.4 per cent of the passenger train mileage during the period. Deducting only the steam train mileage occasioned by the failure of motor cars the percentage is 99.3. The majority of accidents which disable a motor car are grade crossing collisions with motor trucks or automobiles. In case the motor car is unable to proceed it is hauled to its destination and repairs are made in the layover period.

Cost of Operation

Over a period of 34 months, to and including July, 1928, the four motor cars had covered approximately 765,000 miles. The fuel consumption during this period totaled approximately 544,000 gal. of gasoline, resulting in an average of 1.4 miles per gal. On the basis of the 34-month period the average cost of motor-train operation per passenger-train-mile is shown in the table.

Average Cost of Motor-Train Operation Per Train Mile

	Cents per train-mile
Repairs	10.21
Crew wages	13.00
Fuel	9.65
Lubricants	0.85
Other supplies	1.38
Principal operating expense, total	35.09
Total expense of motor-train operation, exclusive of relief-train maintenance and operation	52.45
Total expense, including relief-train maintenance and operation	55.39
Cost of equivalent 100 per cent steam-train operation	84.70
Saving, due to motor car operation	29.31

Inspection and Maintenance

Up to the present time there has been no occasion to make heavy repairs to these cars. The principal re-

pair point on the Cincinnati Northern is at Van Wert. As the runs are now arranged, one car lays over night at Cincinnati, another at Jackson and the remaining two at Van Wert. This overnight layover period is utilized to make a thorough inspection of the cars and to make light running repairs. Any heavier repair work is performed in the 36-hr. period between 8:30 p. m. Saturday and 6:00 a. m. Monday. Each car makes an average of 1,500 miles a week and the oil in the engines is changed regularly once a week. The cars are pooled in service so that it is possible to cut out each of the four cars for an overnight layover at Van Wert once a week for oil change.

The maintenance of the mechanical equipment has consisted principally of regrinding the valves in the engines and cleaning the carbon out on an average of about once each 12,000 miles.

Proposed Coal Legislation Inimical to Railroads

WASHINGTON, D. C.

OPPOSITION to provisions of the bill now under consideration by the Senate committee on interstate commerce for the regulation of the bituminous coal industry, with particular reference to authority proposed to be conferred on a bituminous coal commission which would affect the interests of the railroads, was expressed by C. S. Duncan, economist for the Association of Railway Executives, at a hearing before the committee on January 16.

The bill would authorize the coal commission to investigate the fuel service of railroads and would prohibit a railroad from building any siding or switch, or from cutting its lines for any siding or switch to any bituminous coal mine or tipple, until after it has received permission from the Interstate Commerce Commission to do so, with a provision that such permission shall only be granted upon approval of the coal commission. Dr. Duncan summarized the specific objections from the standpoint of the carriers as follows:

1. It would interfere with the supply of railroad fuel. The carriers are responsible for safe and continuous operation regardless of any inadequacy that may exist in the supply of coal. In making purchases, therefore, the first consideration must be continuity of supply. So far as Senate Bill 4490 is concerned, the railroads' experience during the World War and subsequently, leads to the conclusion that, since the allocation of the purchases of coal by carriers which require a suitable character of coal would be beyond the control of railroad management, the operation of this bill would interfere seriously with the continuity of their fuel supply.

2. It would increase railroad operating costs. No one will dispute that this bill aims to increase the cost of coal and thereby increase the cost of railroad operation. It takes from railroad management its right to purchase this commodity without restrictions, a freedom in the exercise of managerial judgment which the carriers have with respect to all other commodities that they buy. The language of this bill is very indefinite but, as we understand it, it is intended to give to the contemplated coal commission the right to dictate to the carriers at which mines they may secure their coal. This would place the buyer at the mercy of the seller and would, no doubt, result in exorbitant demands and continuously increasing prices for railroad coal. It is to be observed, furthermore, that there is no provision here requiring the coal producer to sell to the railroad, thus limiting and restricting the power of the carriers as purchasers of coal, while leaving other purchasers and the seller free.

With the carriers as a whole earning considerably less than the rate of fair return established by law, the resulting increase in cost of fuel would no doubt have to be made up by an increase in rates.

3. We are also advised that the provisions of the bill constitute an invalid invasion of the carriers' freedom of contract. The attempted restriction in this bill on the right of purchase has no such relation with legitimate regulation as to bring this bill within the power of Congress to regulate commerce.

Commissioner Porter Working on Consolidation Plan

WASHINGTON, D. C.

WHILE efforts are still being made, with scant prospects of success in the near future, to induce Congress to act on a railroad consolidation bill which would remove the present direction to the Interstate Commerce Commission to prepare a complete consolidation plan, Commissioner Porter of the commission is going forward with efforts to prepare such a plan in accordance with the provisions of the present law, for submission to the commission. For four years the commission in its annual reports to Congress has recommended legislation which would omit the idea of a pre-conceived plan with which unifications to be proposed by the railroads must harmonize to obtain approval, and its reiteration of the recommendation in its report submitted in December represents its latest official word on the subject.

Commissioner Porter, however, believes that in the absence of action by Congress the commission is still under the injunction of the law passed in 1920 and that it ought to be making some progress in that direction. It is understood, also, that some other members of the commission agree with him but that the commission has taken no action in the matter since it assigned the subject of consolidation to his docket last Spring, shortly after he became a member of the Commission to succeed Commissioner H. C. Hall. Commissioner Hall, who presided over the hearings on the tentative plan promulgated in 1921, was chairman of a consolidation committee of the commission, but there have been no meetings of such a committee for several years. A recently published press report gave an impression that the commission had officially decided, in spite of its recommendations to Congress, to go ahead with the preparation of a plan without waiting longer for legislation. It is authoritatively stated, however, that no such action has been taken by the commission and that the implied inconsistency between such a step and its repeated recommendations to Congress cannot be attributed to it.

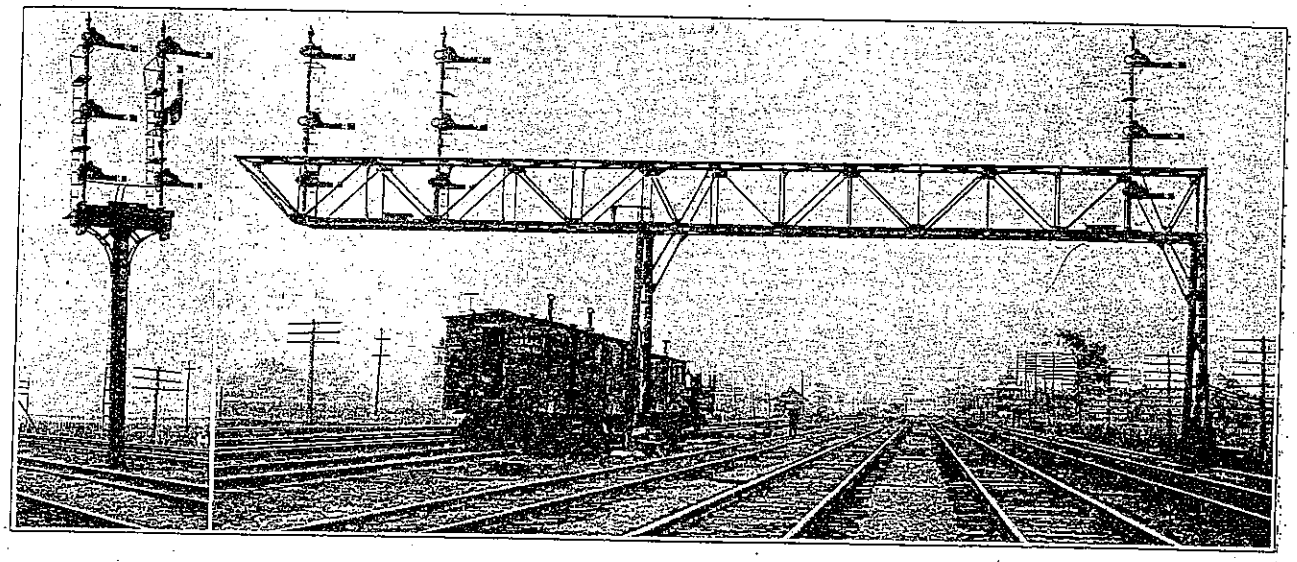
Little Prospect for Further Action

However, there seems little prospect that Congress will take any further action on the Parker or Fess bills at this session of Congress and the expected special session, to begin shortly after Mr. Hoover becomes President, is intended to be devoted mainly, if not exclusively, to farm relief and tariff legislation. Meanwhile the consolidation question is expected to be brought before the commission again in an insistent way by a formal presentation to it of the "four-system plan" for a grouping of the eastern railroads. Although the roads have not been able to reach a complete agreement, it is reported that the Van Sweringen interests and the Baltimore & Ohio, at least, are preparing to ask the commission's approval of the allocation of certain roads to them, including some in which they have no present interest, as well as those in which they have acquired a stock interest.

Electric Interlocking at Rome, New York

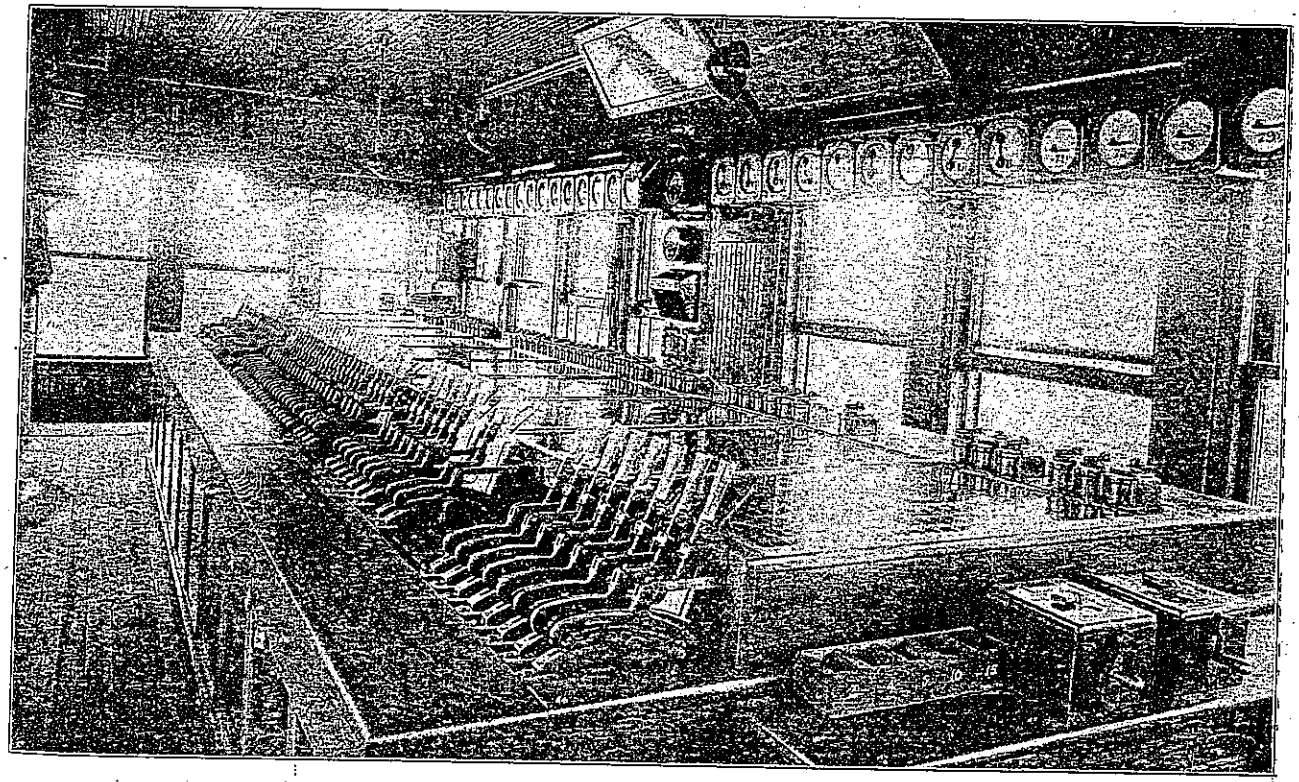
Speed Conditions Required No. 14 Turnouts. Restricted Track Centers Necessitated Special Signal Supports

At Rome, 109 miles west of Albany, the line of the New York Central & Hudson River expands from four tracks on the east to six tracks on the west. At this point, an 80-lever electric interlocking has been installed to operate the crossovers and turnouts. The improvements are on an entirely new line of road, which was built to eliminate two crossings with the New York State Barge Canal, as located, and which improvements were described last year in the *Railway Age Gazette* of August 15, 1913.



Bracket Post, Looking West; Cantilever Signal Bridge, Looking East

As the layout is to provide for high speed traffic, No. 14 crossovers are used throughout, and turnouts from the ladder leading to the fifth and sixth tracks are also No. 14. The use of these long turnouts makes the interlocking plant a long one. The speed restrictions through this interlocking are: Tracks



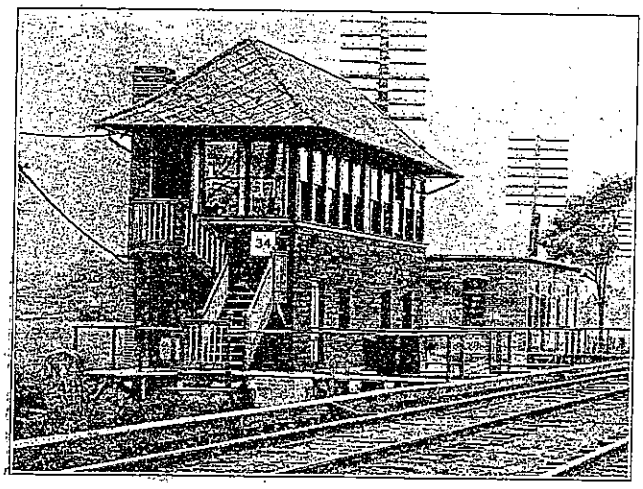
Federal All-Electric Interlocking Machine, Rome, N. Y.

1 and 2, maximum speed 40 miles an hour; tracks 3 and 4, maximum speed 20 miles an hour.

SIGNALS AND SIGNAL SUPPORTS

The cantilever signal bridge supporting the eastbound home signals for tracks 1, 4 and 5 is an interesting feature of this plant. The main part of the bridge spans tracks 1, 2, 3, and a siding, with one support outside of track number 1 and one between track No. 4 and the siding. The cantilever section projects over a second siding and also over tracks Nos. 4 and 5. The accompanying illustration shows this bridge and also the bracket post at the east end of the plant adjacent to track No. 3 supporting the westbound home signals for tracks Nos. 2 and 3 (signals 73, 74, 75, 77, 78, 79). These two special types of support were made necessary by the arrangement of track centers, and by the necessity for locating the foundations between tracks in such positions as to allow sufficient clearance.

The signals are three-position, moving in the upper quadrant. The high arms are the Federal Railway Signal Company's top post, 110-volt d. c. motor type and operate as semi-automatic non-stick signals. The dwarf signals are Style 4, Federal Railway Signal Company's design, the mechanism being exactly the same as that used in the top post signals; but when used in



New York Central Signal Station, Rome, N. Y.

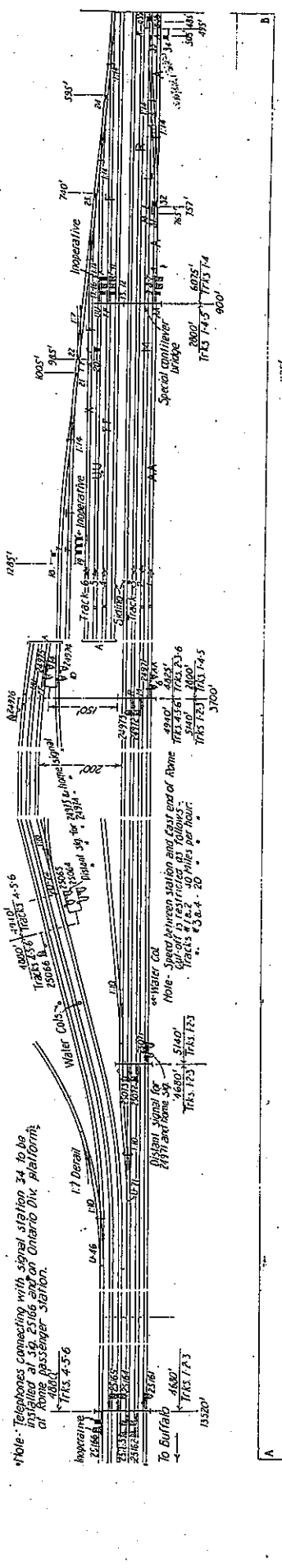
dwarf signals it is mounted on cast iron supports, which are bolted directly to concrete foundations.

All signals are electric lighted, the current used being 100-volt d. c. Each light has two 2-c. p., 100-volt carbon lamps. In case the first lamp fails to light or is burnt out, a cut-in relay completes the circuit to the second lamp. Night indications are green for clear, yellow for caution and red for stop.

The interlocking machine is of the Federal Signal Company's standard type, and has 59 working levers, 4 spare levers and 17 spare spaces, in an 80-lever frame. Thirty-five levers operate 40 signals and 24 levers operate 23 switches and 1 derail. This plant has but one interlocked derail, that on the ladder track leading to track No. 6 at switch 23. The complete outfit of crossovers provides diverging tracks for any and every movement which convenient and safe block signaling may make necessary; and derails, as substitutes for diverging tracks, are not needed.

SIGNAL CABIN

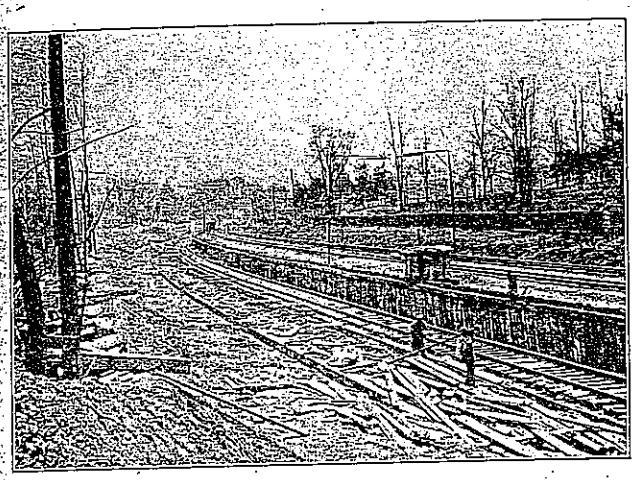
The signal tower, 12 ft. by 38 ft. 4 in. outside dimensions, is a two-story frame structure set on a concrete foundation. The lower floor contains the hot water heating plant and the relay track. The second floor contains the interlocking machine, the operating board, a group of unit type indicators strung across the top of the windows, and the operator's table. In the relay track on the lower floor there are 112 wall type glass-enclosed relays of the Hall Switch & Signal Company's type.



THIRD AND FOURTH TRACK CONSTRUCTION.

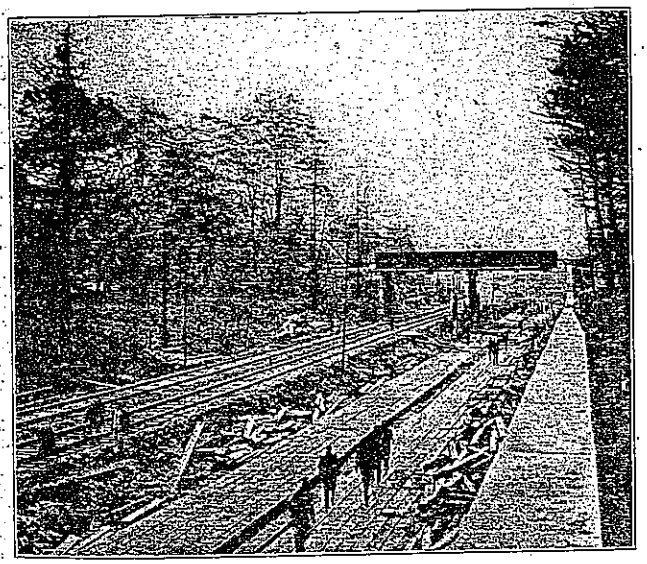
Geological and Traffic Conditions Created Unusual Problems on New York Central Between Albany and New York.

The New York Central & Hudson River has been carrying on the construction of third and fourth tracks between Albany and New York for the past three or four years. Because of the location of this line on the east bank of the Hudson river where the high bluffs approach very close to the water's edge,



Building New Tracks on Trestles North of Staatsburg.

this work has necessarily been very difficult and expensive, especially since the alinement is being improved at many points by the elimination of curves and at other places by reductions in the degree of curvature. The existing two tracks have been

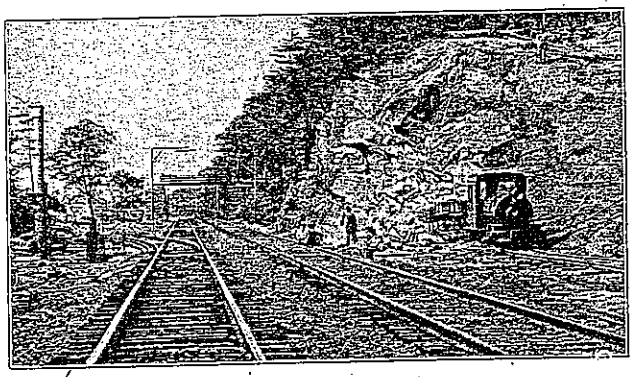


Deck of Trestle in Staatsburg Cut.

very badly congested for some time as a very heavy passenger business, nearly all of which consists of important fast trains, is handled in addition to a heavy freight movement. There are 43 scheduled passenger trains and an average of 30 freight trains daily. The natural conditions combined with this heavy traffic make progress on this work slow and render necessary the taking of many precautions to prevent interference to traffic.

As the conditions met in all the work on this road between New York and Albany are largely similar, a description of the problems encountered on the 11 miles between Staatsburg and Barrytown, which is now being completed, will be in a general way typical.

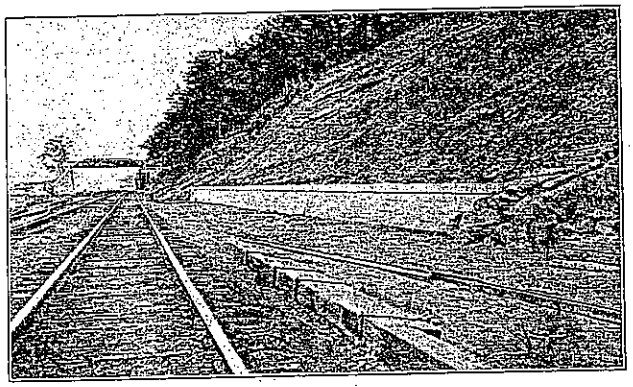
The geological conditions in this vicinity are very interesting and are to a large extent responsible for the difficulties encountered. The rock on both sides of the Hudson river is of a very uncertain character and rather than being regular, there exists a very uniform lack of regularity. Lying nearly in the region of the Appalachian upfolding, this rock has been distorted and twisted greatly until it is now very badly broken and is inclined at all angles and in all directions. As a result the rock is rotten in the extreme and is full of pockets of clay and quicksand which are encountered most unexpectedly. In



Rock Face in Front of Soft Material.

some places the rock slopes sharply towards the river with a bed of silt or clay clinging to it on which the roadbed must rest. Again it may incline away from the river and contain pockets of quicksand forming sink holes over which the track must be laid. In some instances the rock is nearly vertical and a slight movement will dislodge large masses which may descend on the tracks.

No records are available regarding the difficulties encountered in building the original road, and later the second track, but they were probably small compared with those recently encountered, as the early roadbed was narrow and the undisturbed



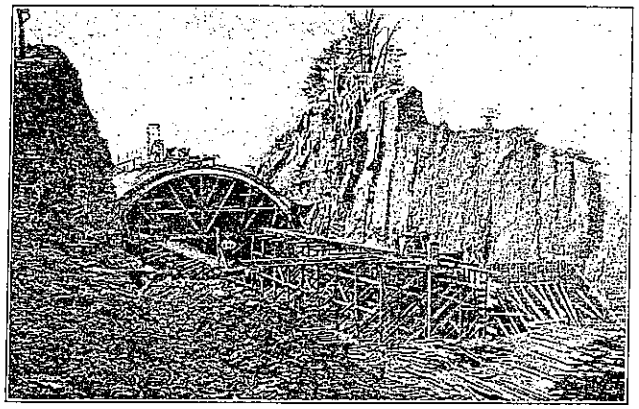
Completed Slope Showing No Indication of Rock Face in Original Cut.

portions of the foundation material were sufficiently stable to support the loads and maintain equilibrium.

Many of the sink holes are short, with rock cuts at either end; this condition of itself introducing serious complications

in maintaining smooth riding track under high speed trains. In one instance a ledge of rock projects under one rail while the other rail is supported on a bed of mud, necessitating in itself, very careful maintenance.

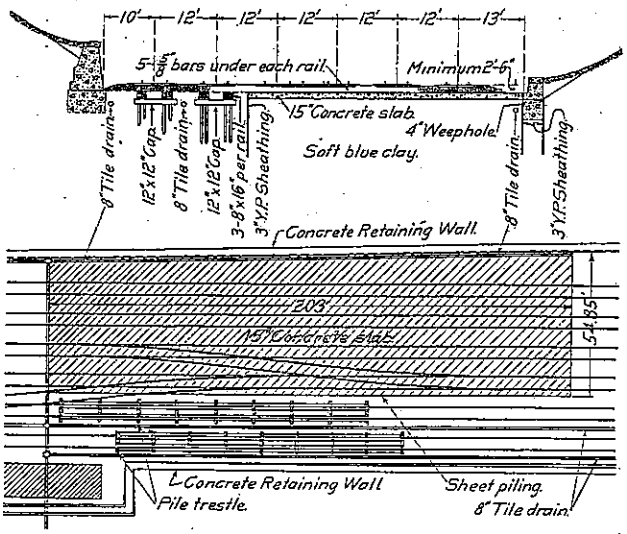
In the vicinity of Staatsburg a number of these sink holes were encountered. At one point there existed a peat pocket 300 ft. long and 10 ft. deep resting on rock. Sheet piling was driven adjacent to the main track, the bed excavated under the new tracks and the hole backfilled with rock on which the new tracks were laid. At another point where similar material was encountered, but to a greater depth, sheet piling was driven between the new and old tracks to prevent the flow of material from under these tracks. Piles were driven and capped under the new tracks and a solid floor of 12 in. x 12 in. stringers laid lengthwise with the tracks, on which the ties and track structure were placed. As the ground water level is practically at the surface, it is expected that this construction will be protected from decay for some time to come. The accompanying photographs show details of the work at this point.



North Portal of the Astor Tunnel Showing Centering and Concrete Mixing Equipment.

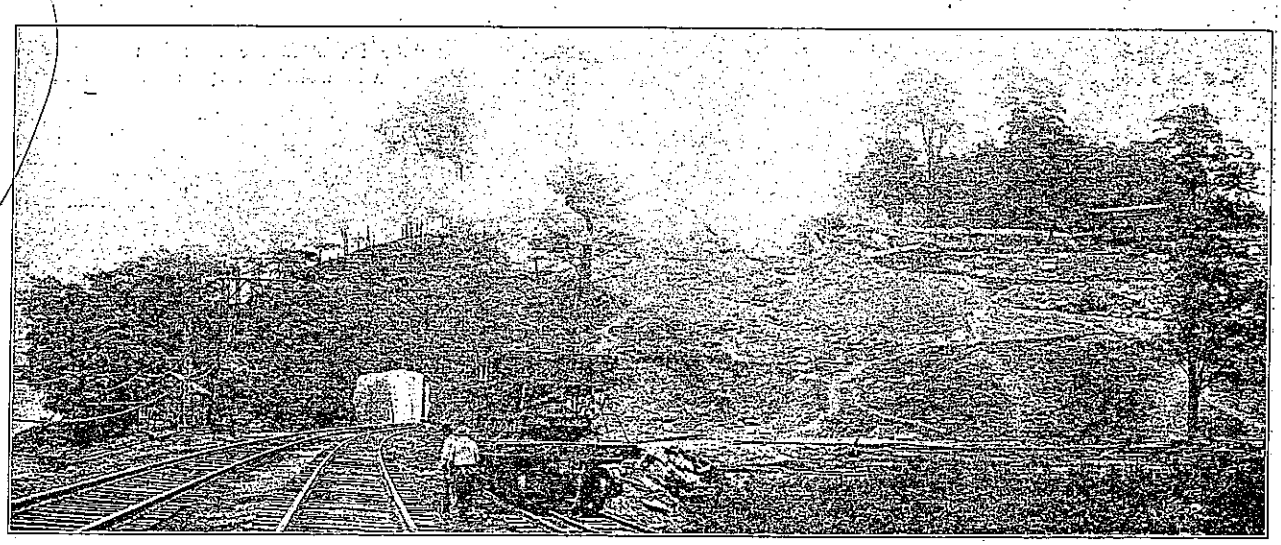
As is to be expected under these circumstances, much settlement is encountered on fills and large mud waves frequently appear. These conditions interfered greatly with the estimates of material and made impossible the balancing of quantities with any degree of accuracy. One interesting fact noted is that the settlement has uniformly been greater where the new tracks have been placed on the land side of the old fills than when on the river side.

Near Rhinecliff, where a cut was to be widened for additional tracks on the land side, the face of the cut gave every indication of solid rock, and plans were made to excavate accordingly. When construction began it was found that this rock was but a surface shell a few feet thick and that back of it there was a pocket of very unstable material. When this was discovered, plans for the handling of work had to be changed immediately and additional right of way secured to provide for the increased slopes. One of the accompanying photographs shows this condition when the steam shovel was uncovering the softer material behind the rock.



Plan and Elevation of Concrete Slabs Required in Poughkeepsie Cuts.

Owing to the close proximity of the old line, extreme care was necessary at all times when blasting rock. This was especially necessary because of the character of the material. Many times the effect of comparatively light shots was felt on the back of a ledge of rock at a distance from the point where work was being done; in some instances this effect being noticed at 20 ft. through apparently solid rock resulting in dislodging large pieces. In other instances large quantities have been removed by comparatively light charges because of the opening



Beginning Excavation for the New Astor Tunnel.

numerous seams that were not known to exist. The rock crumbled readily when blasted so that nearly all of it could be removed by the steam shovel. This uncertain character of the rock made necessary constant inspection day and night to insure protection against detached pieces of rock being jarred loose and falling on the main tracks.

At several places the present line tunnels through points of rock extending into the river. In connection with the construction of additional tracks, these tunnels are in several instances being replaced with open cuts. At such places great care must be taken to prevent the rock from falling on the tracks, especially as much of the rock in the tunnel roofs is badly eaten by locomotive gases.

At the John Jacob Astor estate, two miles north of Rhinecliff, previous agreement required the maintenance of a tunnel. As the alinement was changed somewhat at this point, the new tunnel was built independent of the old line. By agreement with the Astor estate, the contractor was permitted to excavate an open cut, construct the tunnel in the open and then cover it, restoring the original surface. The accompanying photographs show this feature clearly. The tunnel consists of a flat concrete arch with a span of 58 ft. 1 in. and a maximum rise of 35 ft. above the top of rail.

The presence of large estates bordering the tracks with riparian rights extending to the river required, in many instances, special precautions to maintain slopes and to prevent injury to trees, etc. In several instances where bridges were raised and new embankments built, walled pits were left in the slopes about the trees.

Where the new tracks were built on the river side, less difficulty was encountered, although it was only possible to build on this side at certain places because of the great depth of the water. While the river is not wide enough for the wind to create waves of any magnitude, a number of fast steamers run on the river and create waves of considerable size which do damage to unprotected banks. For this reason, all new embankments were protected with riprap. A dry wall was first built at the toe of the slope of heavy stone brought from building excavations at New York and placed with derricks. Some of the filling material required inside of this wall was also brought up from New York on scows; the contractors securing it from building excavations there.

The track crosses a number of tidal bights where provision must be made for the passage of considerable quantities of water every 12 hours. Openings were made at these places, either by culverts or short bridges. Cast iron pipe and concrete boxes were used for the smaller openings while the bridges were built of I beams embedded in concrete and resting on concrete abutments.

A very interesting problem was encountered in Poughkeepsie where similar work is under way. While some difficulty had been experienced in holding the tracks to surface in several places, no unusual difficulties were anticipated. However, when the widening of the cuts was undertaken, trouble was suddenly encountered in holding the new tracks up. In two different instances these tracks were left in good condition in the evening and showed no signs of weakness under heavy traffic during the early portion of the night; however, towards morning they suddenly dropped, creating such a condition that traffic could only move over them with great care. In order to insure continuous operation, it became necessary to drive piling under these tracks the length of these pockets and build standard trestle construction. A wall of sheet piling was then driven between these and the adjacent tracks to prevent any movement of material and the material under the remaining tracks was then excavated. Following this a concrete slab was laid under the remaining tracks the entire length of the sink holes, resting directly on the mud, and designed to confine this material as well as to distribute the load. The results so far, indicate that this has been successful. This construction was required in three instances at Poughkeepsie. The length of concrete mats required ranged from 90 ft. to 910 ft., and they extended under four and five tracks.

This construction work was all handled under the direction of G. W. Kittredge, chief engineer; J. W. Pfau, engineer of construction, and R. E. Dougherty, district engineer, with George D. Evans, assistant district engineer, directly in charge.

ORGANIZATION OF FLOATING GANG TO TRAIN FOREMEN.*

By W. H. CLEVELAND,
Roadmaster, Atchison, Topeka & Santa Fe, Wellington, Kan.

A school for section men is often advocated in its various phases. One of the popular ideas is monthly meetings, held at some point on each division. This is good as far as it goes, but it merely provides for an exchange of ideas and explanations and social friendship. The only way that proficiency can be gained is by actual experience; by being brought in actual contact with the work, in all its varying conditions; by working under the supervision of some one who is master of the art. There must also be some object in view, something in sight to work for. There must be, first, present means of support, second, assurance of future promotion.

To provide a supply of competent foremen for the future, I would recommend the systematic organization of floating gangs. On each superintendent's division organize one small floating gang as large as the working conditions of the division will permit. Let this gang consist of from six to ten laborers. Let the men employed in this gang be selected from the ranks of American labor, of the proper age and of the highest intelligence that it is possible to obtain. Pay them wages as much above those of the foreign labor as the division conditions will warrant, taking into consideration, the wages paid locally to labor in other industries, and let them understand that they are in line for promotion as their experience and proficiency warrant. Place the most experienced foreman you have over this gang; a man who is master of the profession in all its features; a man whose qualifications place him in line for promotion to the position of roadmaster. Pay him the extra gang foreman's salary and let him understand that his business is to do a high standard of work, supervise all work, and act as instructor of the men under him, to fit them for positions as foremen. Place this gang in good comfortable bunk cars with a boarding car for the men, so that they will always be at home with the outfit. Let the foreman board the men. Equip them with the necessary tools for doing all kinds of work, including emergency work—wrecks, washouts, etc. Furnish them with standard blue prints and rules and literature. Then use this gang on any part of the division where it is needed. If there are switches to be laid or improvements of any kind to be made on any section, move this gang there and let it do the work in connection with the regular section gang, schooling the men in the art of switch laying and track laying to standard. In this manner the regular section gangs will get the schooling and instruction which will greatly benefit them. Make it the duty of the instructing foreman thoroughly to instruct each foreman and gang on whose territory he is working and make some part of every Sunday an information day for this gang and the foremen and men near where he happens to be stationed. Once a month let the roadmaster be present and make it a general instruction meeting, taking up the matters of timebooks and reports, book of rules, time cards, blue prints and estimates, and the subject of emergencies. In this way the entire division will soon become thoroughly informed on all subjects and will be experienced in all standard and emergency work. Then when you want a relief or permanent foreman you can promote a high class man from this gang and immediately fill his place in the gang with a new man. If you want a relief or permanent

*Received in the contest on The Foreman Problem, which closed March 25, 1912.

NEW YORK CENTRAL IMPROVEMENTS AT ROME.

Realinement Made Necessary by Construction of Barge Canal Involved Street and Stream Crossings and a New Station.

By Emile Low,
Consulting Engineer, Buffalo, N. Y.

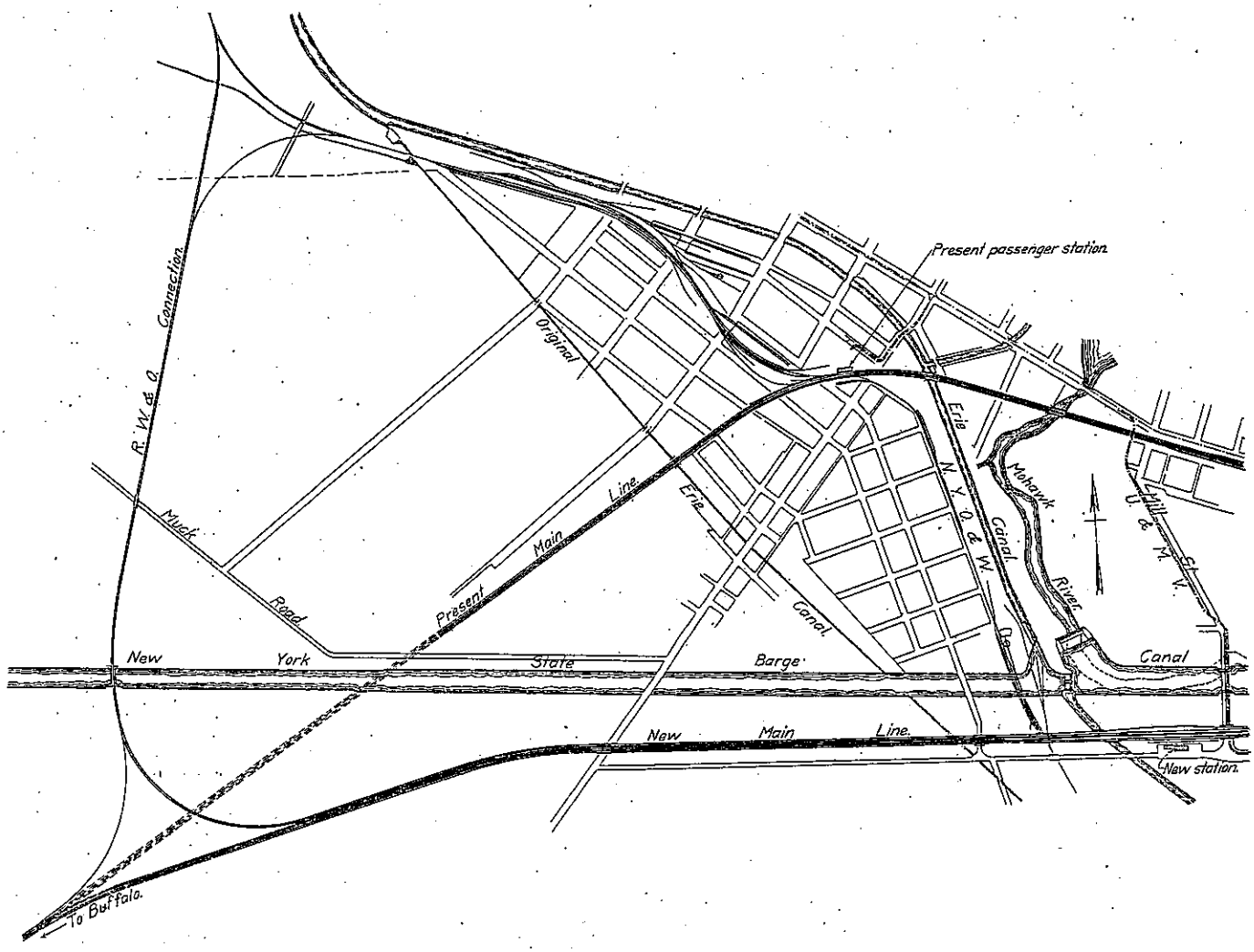
The New York Central & Hudson River, east of Syracuse, N. Y., roughly parallels the Erie Canal, although between the crossing west of Canastota and that at Rome, the canal and the railroad are as much as four miles apart at places. The original Erie Canal, which was begun at Rome on July 4, 1817, crossed the divide between the Mohawk river and Wood Creek at Rome at its lowest point, its water elevation being 3 ft. lower than the present canal. When the first enlargement of the Erie Canal was made in 1845, its location at Rome was shifted to the north about one-half mile, skirting along the foot of a slight declivity forming the southern boundary of the town. It then turned to the south, intersecting the original canal at a small settlement known as Stanwix on the south of the valley.

The New York Central crosses the present canal nearly at right angles, just east of the station at Rome and just west of the crossing of the Mohawk river. It recrosses the river about four miles east of Rome, running along the south bank to beyond Utica.

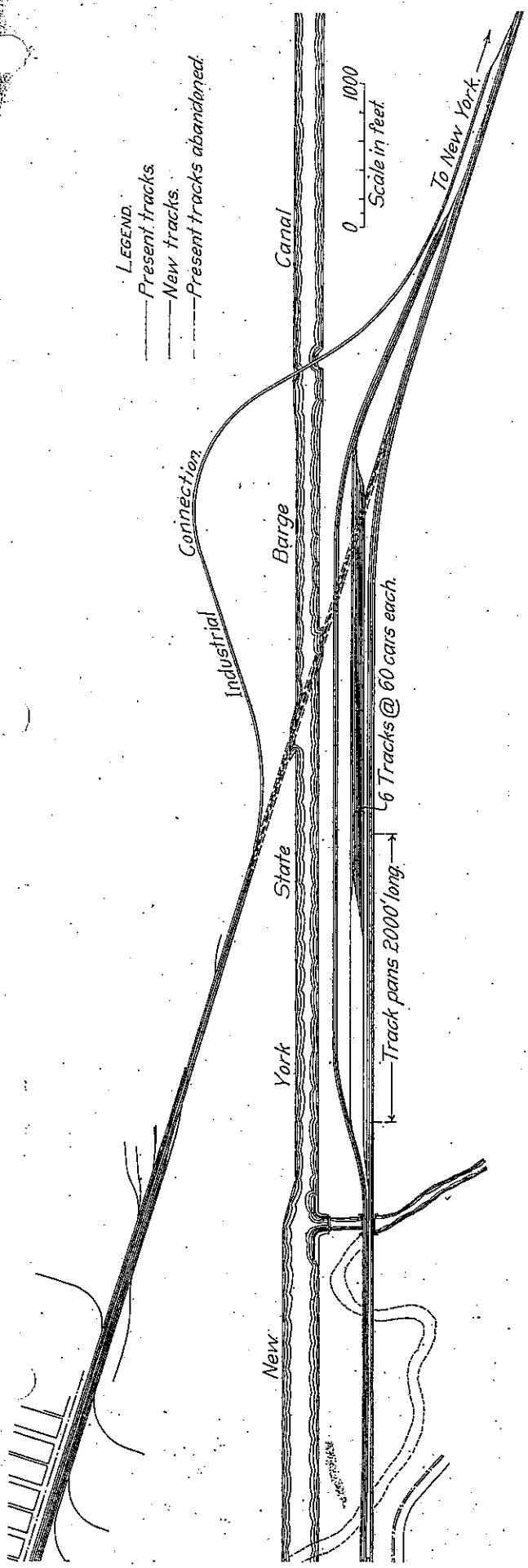
As in many other towns, the main industries of Rome are located along the line of the present railroad, nearly all east of the passenger station, on both sides of the track; they consist largely of copper and brass works and allied industries, and also the Rome Locomotive Works. The notable exception is the Rome Rolling Mill on the Erie Canal which has track connection with the New York, Ontario & Western. This railroad and also the Rome, Watertown & Ogdensburg, now a branch of the New York Central, connect with the New York Central at the present passenger station.

When the Barge Canal became a certainty, its location at Rome was a serious problem. The proposed ship canal from Oswego to the Hudson river was located years ago south of Rome, with two draw bridges to carry the New York Central. The writer had charge of the location of the Barge Canal at this point during the years 1904-7, and his first examination indicated that a relocation of the New York Central south of the present line was imperative with the Barge Canal about 500 ft. north of and parallel to the revised line.

After every possible location had been surveyed this plan with slight modification was adopted and is now being executed. The new line leaves the old about 9,000 ft. west of the present passenger station, by a 1 deg. 30 min. curve to the right, the curve being followed by a tangent about 3,000 ft. long, then another 1



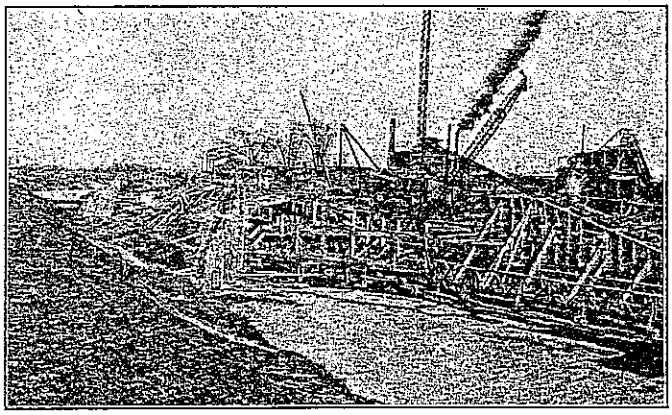
Partial Plan of New York Central Improvements at Rome, N. Y.



Remaining Portion of Plan on New York Central Improvements at Rome, N. Y., but on a Larger Scale Than the Portion Shown on the Opposite Page.

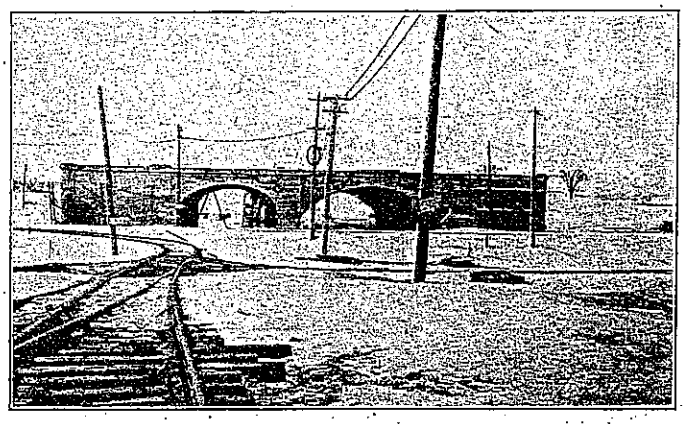
deg. 30 min. curve to the right, followed by a tangent over two miles long at the end of which a connection with the present line is made by a 1 deg. curve, the total length of the improvement being about four miles. A new connection with the R. W. & O. is being made at the eastern end of the main line change, and from this connection east the four tracks of the N. Y. C. & H. R. and the two of the R. W. & O. are side by side, making a six track line. These tracks cross James street, the old Erie Canal, Lawrence street, the New York, Ontario & Western and the present Erie Canal.

Immediately east of this canal crossing and between it and



Building the Skew Arch Over the Present Erie Canal.

Mill street is located the new passenger station on the south side of the railroad, facing a new street connecting Mill and James streets. The tracks are numbered from the south to the north. The most southerly one is the eastbound passenger, No. 2, the westbound passenger, No. 3, the westbound freight, No. 4, the eastbound freight, and Nos. 5 and 6 the R. W. & O. The island platforms will be 1,200 ft. long, one between tracks 2 and 3 serving the westbound New York Central passenger track and one between tracks 5 and 6 serving both R. W. & O. tracks. The platforms are reached by a subway and stairs. The station will be a brick structure 210 ft. long x 50 ft. wide, with all accom-



Double Arch Over Mill Street and the U. & M. V. Electric Railway.

modations for passengers on the street level. It will be set back from the tracks a sufficient distance to allow the embankment to take its natural slope and passengers will reach the track platform along the eastbound main by a covered bridge from the second story of the station.

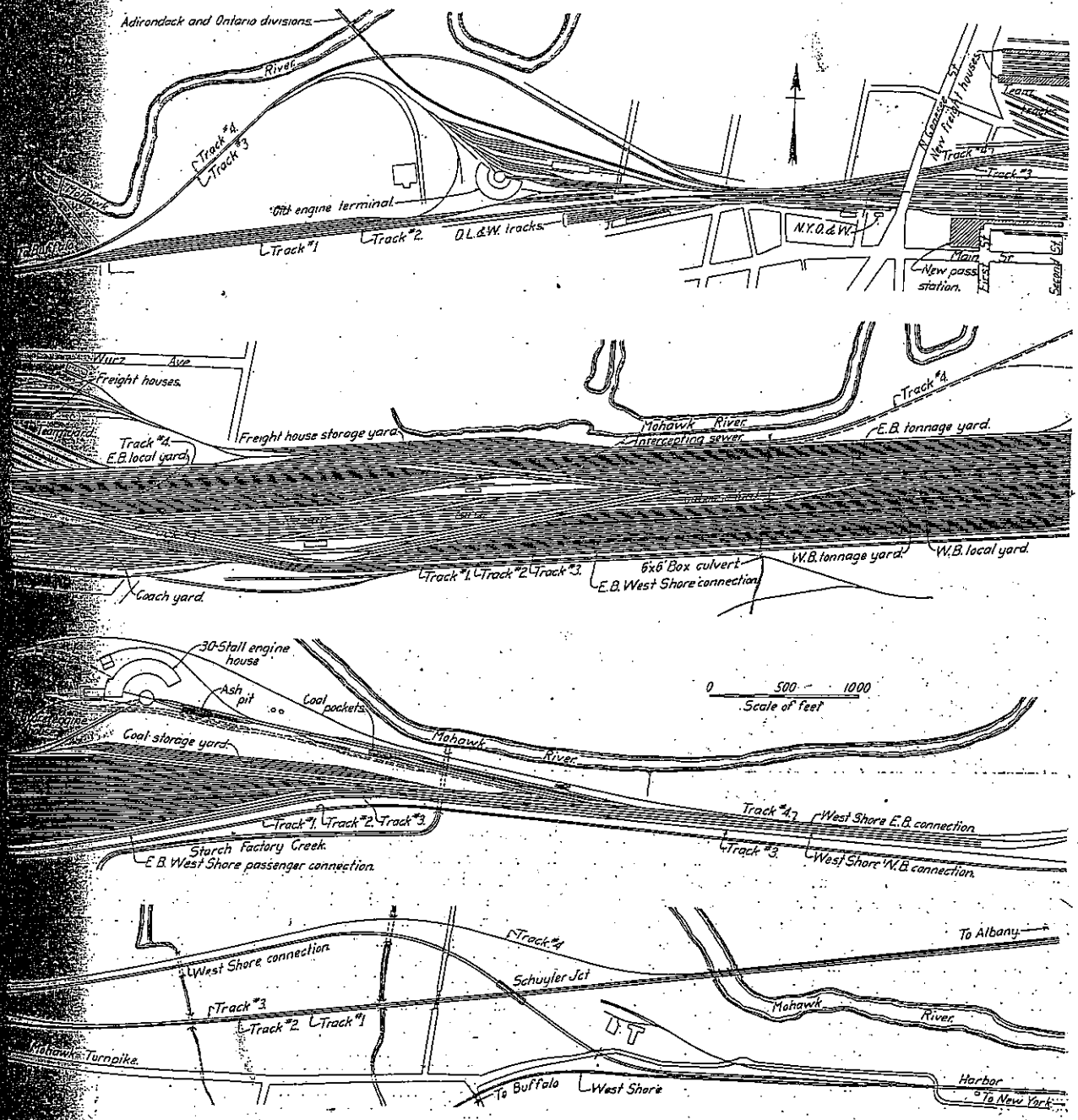
The main waiting room will be in the east end of the building, reached directly from the street by two large doors on the south side. The ticket office, which will be 40 ft. long, is located between these doors; the women's retiring and rest rooms occupy the entire east side of the main waiting room and the men's

The New York Central's Improvements at Utica, N. Y.

Construction of New Passenger Station, Freight Houses, Classification Yards and Engine Terminal

The New York Central & Hudson River's new passenger station at Utica, N. Y., opened on May 24, is one of the important features of the extensive improvement work that the company has been carrying out in Utica for several years past and which, when completed, will represent an estimated investment of $6,000,000. Utica is an important point, both for passenger traffic, on account of its location on the line between Albany and Buffalo at the junction of the West Shore, the Ontario and the Adirondack divisions. About 30 passenger trains are operated in each direction daily from Utica on the main line and about 12 on the other lines. The total daily car movement into and out of the Utica freight yard was shown by a check made last summer to exceed 1,100 cars. The distribution of this freight business is shown in the accompanying traffic diagram.

As the West Shore is electrified and operated by a separate company west of Utica, all freight except for points in electrified territory is handled over the main line west of that point. East of Utica either the main line or the West Shore may be used for freight traffic, connections at Utica, Hoff-

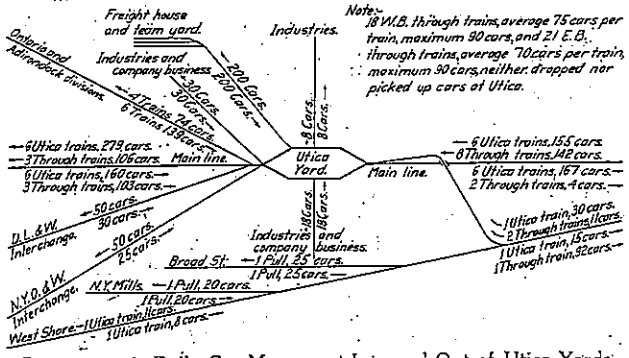


General Layout of the Ultimate Yard Development at Utica, Only a Portion of Which Has Been Built

mans, and Carmen making the operation quite flexible. A large amount of business between New York and Montreal also passes through Utica. Practically no classification of through freight is made at Utica, but all local business and all transfer freight from the West Shore, the Watertown line, the Adirondack division and foreign roads must be classified there.

NATURE OF THE IMPROVEMENTS

As substantially all of the city lies to the south of the main line, the company negotiated with the city for the straightening of the channel of the Mohawk river immediately adjacent to the old layout on the north, to remove that obstruction to development of the terminal facilities. An agreement was finally reached under which the city constructed a new river channel about 2,000 ft. north of the main line and the New York Central purchased the excavated material at a fixed unit price to be used in refilling the old channel. A large outfall or intercepting sewer was necessary in order to carry out this agreement, running under the passenger and freight yards to the river about one mile east of the station.



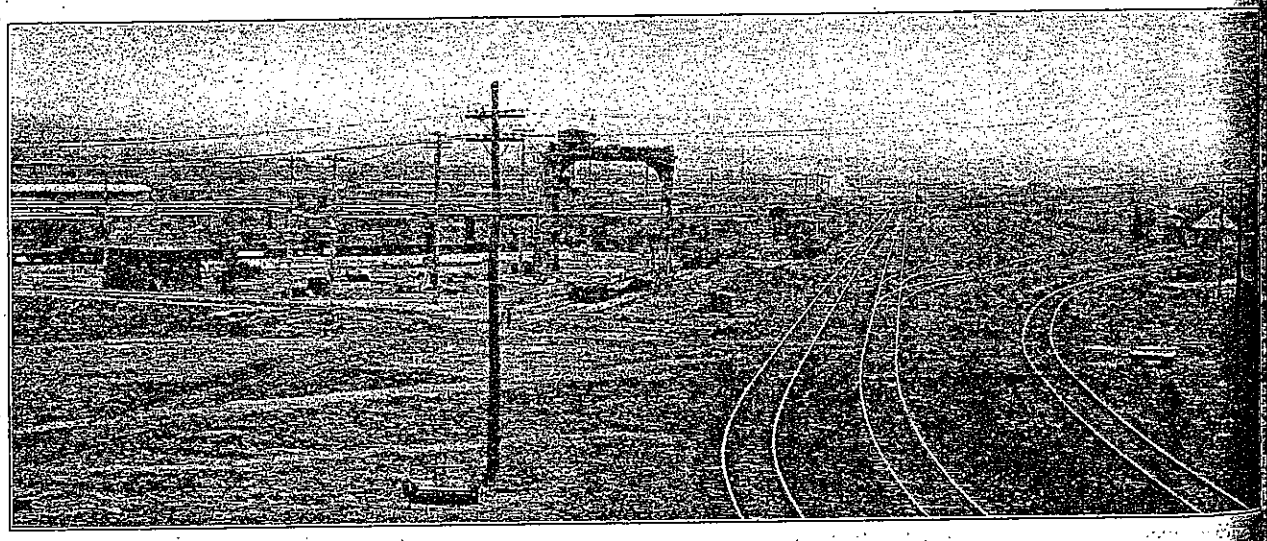
Diagrammatic Daily Car Movement Into and Out of Utica Yards

The next step was the elimination of grade crossings in the vicinity of the station. This involved the closing of Park avenue east of the station, the construction of a new street along the north side of the proposed new layout to connect Genesee street with the extension of Park avenue, and the elevation of Genesee street on a viaduct crossing the main tracks. This viaduct consists of one 40 ft. girder span and five truss spans, varying in length from 70 ft. to 87 ft. Three lines of girders and pony trusses are used in these spans, carrying a roadway 45 ft. 6 in. wide in which are laid two street railway tracks. Two 8 ft. sidewalks are supported outside of the outer trusses. Three-column steel bents on concrete footings, with reinforced concrete collision piers connecting the lower ends of the columns, carry the trusses. The plate girder floor beams and I-beam stringers support reinforced concrete slabs on which the pavement is laid. All steel work with the exception of the girders above the curb is encased in concrete. Concrete facia girders are provided along the outer edges of the sidewalks.

The new local freight facilities are grouped north of the passenger terminal east of and easily accessible from Genesee street. Separate inbound and outbound freight houses of brick construction are provided, the former being 50 ft. wide and 760 ft. long and the latter 30 ft. wide and 500 ft. long. Room for additions of 200 ft. to the length of both houses is provided at the east end of the layout. Eight tracks serve the houses. The team yard contains 14 tracks with a total capacity of 171 cars. These tracks are arranged in pairs with 30 ft. paved driveways between the pairs. There are two additional team tracks of 20 cars capacity each outside of the north station driveway, supplied with a platform and ramps for handling automobiles.

As the new passenger station covers the site occupied by the old station, it was necessary to provide a temporary building for use during the erection of the new station before the old building was torn down. This was located along the north side of the proposed station platform layout with a temporary framed trestle ramp connecting with the Genesee street viaduct. The three northerly platforms serving the station tracks and the north half of the passenger subway were also built before the old station was abandoned.

During the construction of the new passenger facilities



A Portion of the Team Track Yard and East-Bound Local Yard

work was being pushed on the construction of a "jump-over" connection between the West Shore and the main line about 3½ miles east of the passenger station, and on the new classification yard and engine terminal located between the jump-over connection and the passenger terminal. This work involved the construction of a number of minor structures and the handling of large quantities of excavation. The following table indicates the magnitude of the operations that were undertaken:

Items	Old terminal	Present construction	Ultimate development
Right of way	310 acres	728 acres	
Grading excavation	700,000 yd.	6,400,000 yd.	7,500,000
Masonry, culverts	2,400 yd.	13,200 yd.	
Cast iron pipe	75 tons	365 tons	370
Main track	18 miles	18.5 miles	22.8
Yard tracks	11.3 miles	27.1 miles	57.8
Total trackage	29.3 miles	45.6 miles	80.6

JUMP-OVER CONNECTION AND YARDS.

The old single track connection between the West Shore and the main line at Harbor, where the two lines are only 600 ft. apart, required freight trains to pass over a grade and to drag through crossovers on the two passenger tracks which are on the south side of the four-track line. To improve this condition, a double track jump-over connection has been built leaving the West Shore just west of Harbor, crossing the main line overhead and swinging around parallel with the main line east of the main freight yard. The maximum grade on this new connection is 1.02 per cent. compensated. Track 4 is diverted to the north a short distance east of the jump-over connection and is carried north of the entire yard development and engine terminal. Track 3 has been relocated to separate it somewhat from tracks 1 and 2 and place it on a grade which will allow easy connections with the yard. Tracks 1 and 2 are diverted to the south of the yard layout and are carried on a separate embankment for the greater part of their changed length.

The ultimate yard development as planned at present, includes nine yards of the following capacities:

	Tracks	Capacity
Eastbound tonnage yard	20	2,200 cars
Westbound tonnage yard	20	2,200 cars
Eastbound local freight yard	19	1,000 cars
Westbound local freight yard	8	640 cars
Repair yards		380 cars
Freight house and team track storage yard		300 cars
Coal storage yard		300 cars
Coach yard		78 coaches
Caboose yard		90 cabooses
Total capacity		7,188 cars

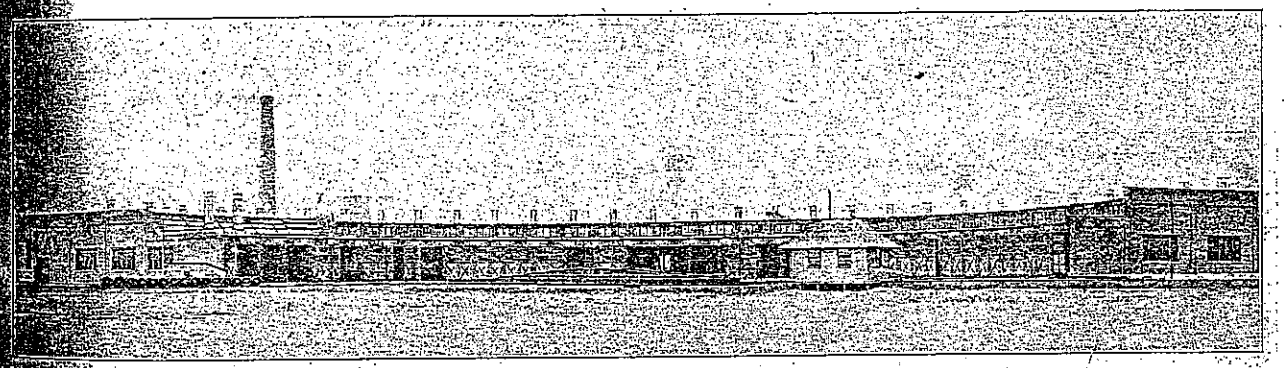
This capacity is in excess of the present demands and it is expected that sections of the yard will be built as required and team outfits were used for making the high fill under the jump-over connection and other miscellaneous grading work.

Starch Factory creek which crossed the yard site, has been diverted to the east in order to shorten the length of the required culvert. This creek is carried under the yard in a 24 ft. concrete arch culvert. A 6 ft. by 6 ft. concrete arch has also been built near the middle of the yard. A three-story frame yardmaster's office and four interlocking towers are also provided. An electric transmission line which crossed the site of the yard had to be relocated to keep it north of the new development and a new crossing has been constructed on steel towers with a maximum height of 98 ft.

The tracks in the main yard are laid on 12 ft. centers with a 16 ft. space in the middle of each of the tonnage yards and between adjacent yards, for piling material, rubbish, etc. An 18 ft. to 20 ft. spacing is standard along ladder tracks, leads and thoroughfares. The tracks in the repair yards are spaced alternately 16 and 20 ft., with two adjacent ladders through the center of the yard, dividing it completely. No. 8 frogs on No. 7 ladders are used for all of the principal yards and No. 10 frogs are the sharpest used on running tracks and main line connections. Main line tracks are laid with 105 lb. rail and yard tracks with 80 lb. relaying rail. Creosoted ties and gravel or cinder ballast are used.

At present the only main line trains that change engines at Utica are tonnage freights and local passengers. For these trains and for the Ontario and the Adirondack trains about 54 engines per day are turned at Utica.

The engine house consists of 30 stalls built on a 70-stall circle with provision for the addition of the same capacity



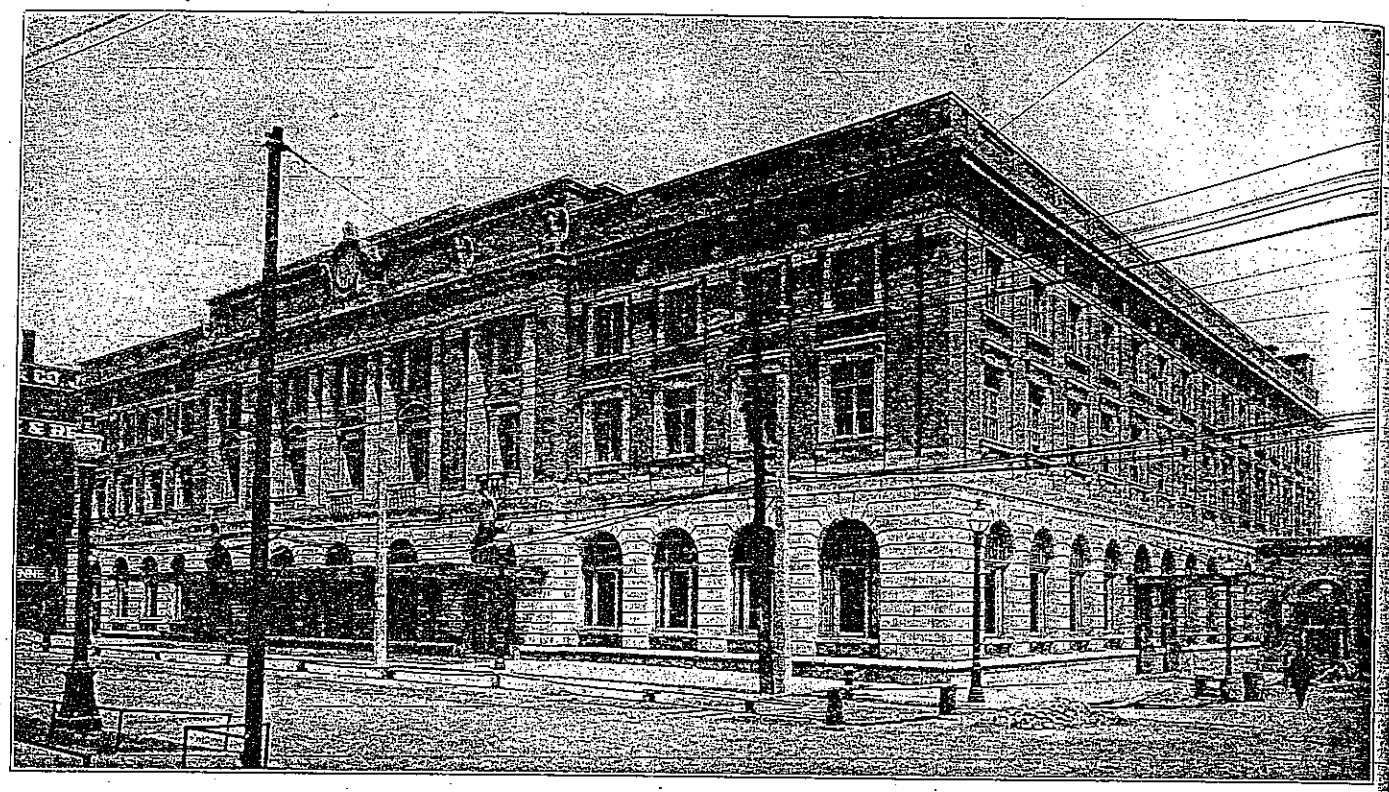
General View of the 30-stall Roundhouse

in a separate house adjacent to the present one. The depth of 25 of the stalls is 100 ft., and of five, 125 ft. Three drop pits are provided in the long stalls, making it possible to remove any wheel from any engine using the house. A 7-ton electric hoist handles the wheels from these drop pits. The house is a brick structure on concrete footings, similar in type to the generally adopted New York Central standard. The engine terminal also includes a machine shop power house, fan house, two double track ash pits 200 ft. long, two inspection pits 80 ft. long, a gravity coal trestle, sand house, two 50,000 gal. wooden storage tanks and four penstocks.

The power house is a brick building 75 ft. by 89 ft. in size. The machine shop is located in an annex building connecting with the long stalls over the drop pits. The coaling trestle is arranged to coal engines on two tracks directly from the pockets and by means of a bridge reaching over to track No. 4 engines can also receive coal on that main track. Clearfield coal is used for freight engines and Pittsburgh coal for passenger engines, provision being made in the pockets to keep these grades separate. The pockets are 160 ft. long and are reached by a trestle on a 5 per cent. grade.

conditions change the plans will doubtless be altered before the completion of the development. Ample room has been left for extensions and changes wherever the possibility of such changes could be foreseen. The yards are served by an ample number of both thoroughfare and engine running tracks.

A large portion of the filling material for the yard and jump-over connection was obtained by hydraulic dredging. Two field towers, one 95 ft. high and one 65 ft. high, operated drag line buckets were used to throw up a dike behind which the hydraulic fill was made. A 20 in. suction dredge with a 40 ft. by 138 ft. hull, equipped with a 750 h. p. engine, a 1,000 h. p. boiler and a 50 ft. ladder, was used on this work. The dredge pumped through pipe lines 800 ft. to 4,600 ft. in length against a maximum head of 35 ft. The material handled contained from 18 to 22 per cent. of solids. This dredge was able to handle 19,400 cu. yd. in 24 hours. A size 7 Bridgerwood dipper dredge was also used for portions of the work, its maximum record being 18,000 yd. in three 8-hour shifts. This dredge was equipped with a 2½ yd. bucket and an 80 ft. boom. A 65-ton Bucyrus steam shovel



The Recently Completed Passenger Station

NEW PASSENGER STATION

The new passenger station is a three-story building 192 ft. by 204 ft. in plan, facing on Main street and on First street, one block east of Genesee street. First street ends at the tracks and provides an entrance to the trucking space alongside the baggage and express building, which extends from the passenger station east to Second street. The front of the station is set back from the street line 18 ft. There are two main entrances on the front covered by heavy marquises. Auxiliary entrances are also provided on both sides of the

The Main Waiting Room in the New Station, Showing Vaulted Ceiling Over Passageway and Beam and Skylight Ceiling Over Seating Lobbies

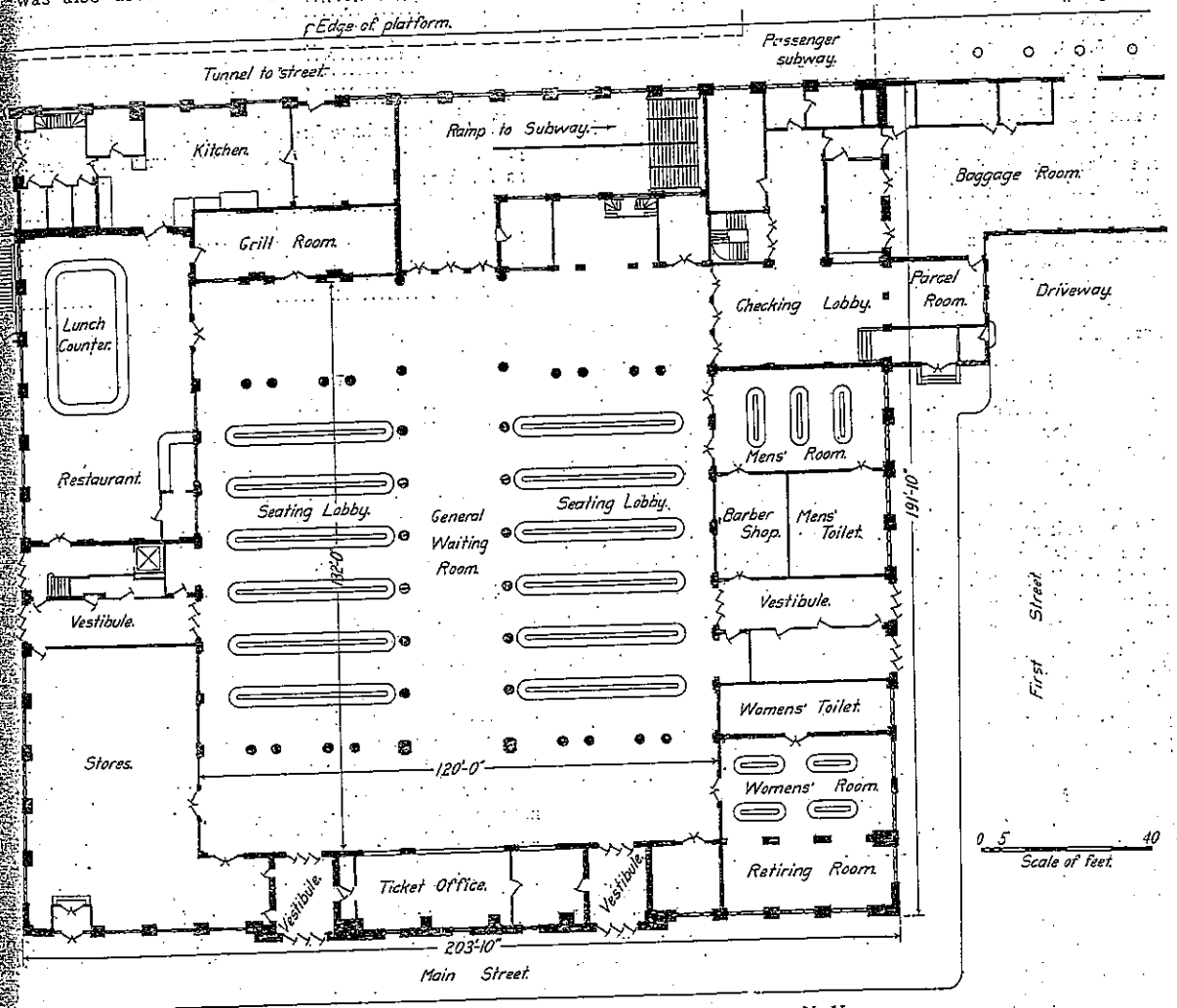
Structurally the station has a steel frame with stone facing up to the first office floor and grayish textured brick for the remaining height. Limestone is used throughout. Architecturally the building is of Roman order with only enough ornamentation to relieve the severity of the lines. The first story supports a colonnade of Roman columns, between which are placed the window openings for the second and third stories. The colonnade is surmounted on the Main street side by a clock 6 ft. 6 in. in diameter supported on either side by cut stone eagles.

The building was designed to rest on spread footings without piles, but as a water-bearing sand was encountered in the excavation, it was decided to use piles under all foundations. A steam shovel was used in excavating for the building, subways, and by rigging a set of leads on this machine was also used for driving piles. As the street in front of the station and the new track level are at approximately the same grade, the main floor of the station on which the public facilities are grouped is kept at approximately the street elevation, and access to the train platforms is provided by a subway under all the tracks connecting by a ramp and short flight of stairs, with the main waiting room in the station and to the street at the west side of the building, allowing incoming passengers to reach the street without passing through the station, if desired.

The two main entrances on the south front of the building open through enclosed vestibules directly into the main waiting room, which is 120 ft. by 132 ft., divided by rows of marble columns into a central and two end passageways and two seating lobbies. The central passageway continues to the north wall of the building where a connection is made with the passenger subway. Each seating lobby contains six double seats. The total capacity is about 400 people. All facilities for handling passenger business are grouped around this main waiting room, including the ticket office, information booth, the women's rooms, barber shop, men's rooms, parcel room and baggage check room, news stand, grill room, restaurant and lunch room. A large rental space, which will be occupied by a store, is located in the southwest corner. The floors in the main waiting room, men's rooms and restaurant are of terrazzo, in the vestibules and ramp leading to the subway of paving tile, in the women's rooms of cork tile, and in the grill room of quarry tile.

The effect of ornamentation has been secured in the interior of the building chiefly by the skilful treatment of permanent materials. Vermont marble of soft gray and green veining has been used throughout for wall facing and columns. The vaulted ceiling over the main isles and the paneled ceiling over the seating lobbies are tinted with a grayish green shade to harmonize with the marble, the relief ornamentation being picked out in dull Roman gold. The woodwork is of oak throughout. The building is heated by steam furnished by three 150 h. p. boilers, located under the baggage house.

The building contains two main office floors, and provision has been made for two elevators, one of which has been in-



Ground Floor Plan of New Passenger Station at Utica, N. Y.

Thirty-four Passengers Killed in Collisions

IN A REAR collision of westbound passenger trains on the New York Central at South Byron, N. Y., seven miles east of Batavia and 43 miles east of Buffalo, on the morning of Sunday, January 12, between 3 and 4 o'clock, 22 passengers were killed and 20 or more injured. The leading train, the second section of No. 17, "The Wolverine," had been stopped for the purpose of having a helping engine attached at the head of the train. The following train, No. 11, the Southwestern Limited, came on at high speed and crushed the rear car, a sleeping car, completely; and the second car from the rear was buckled so that it stood almost on end for a moment and then fell on the rear car, crushing in its roof. The engineman of No. 11 said that his application of the brakes was followed by the parting of the coupling behind the tender so that the brakes on the cars had no effect in slackening the speed of the locomotive.

Both of these trains were made up of steel cars of the latest type. The line is equipped with the latest design of automatic block signals.

The engineman of No. 17 claimed that the block signals were clear; but the signal apparatus was found working properly after the collision, the first signal in the rear was found in the stop position and the second one in the caution position. A statement issued by the road says:

"The flagman of train No. 17 states that a red fusee which he had placed on the track was burning when No. 11 passed him and ran over the fusee and ran into No. 17.

"The engineer on train No. 11 states that the automatic signals were clear when he passed. He also states that he did not see the flagman of No. 17.

"The fireman on a freight engine which stood on an adjacent track says he saw the flagman of No. 17 go back and also saw him signal No. 11 to stop by swinging his red lantern.

"The towerman, who had a view of the scene, also testifies that he saw the flagman of No. 17 signalling No. 11 to stop by swinging his red lantern and setting the red fusee burning. The towerman likewise testifies that the automatic block signals were set against No. 11.

"The engineer on No. 11 had a clear view for a distance of two miles, and it was a cold, clear night. The rear red lights on No. 17 were both burning brightly, and the engi of No. 11 is unable to give any reason why he did not these marker lamps. He claims he was wide-awake, bu is unable to say why he did not see the flagman of N signaling him to stop or the burning fusee."

The statement of Fireman Brill, of train No. 11, is sub stantially the same as that of Engineman Friedley.

The evidence indicates that the flagman of the stan train had got back about 2,000 feet, and that the fusee pla by him was about 1,500 feet back. Torpedoes placed on th rail by the flagman are said to have been about 800 ft. back The train had been standing about seven minutes.

Engineman Friedley said that he had slept on Sunda night about 12½ hours, his time thenceforward having been spent as shown below:

1—Friday, January 10, 10 p. m., went to bed.
2—Saturday, January 11, 10:30 a. m., rose.
3—Saturday, January 11, 2:45 p. m., registered for train 28.
4—Saturday, January 11, 7:50 p. m., arrived at Syracuse, train 28.
5—Saturday, January 11, 9:50 p. m., registered for westbound train.
6—Sunday, January 12, 3:42 a. m., collision.

During the two hours spent at Syracuse, in the evening Friedley ate his supper and was around the enginehouse.

Fireman Brill was off duty at Buffalo from 4 a. m. of the 10th until 3:15 p. m. of the 11th, after which time he was with Friedley.

It will be noted that Friedley had been out of bed about 17 hours, thus making the circumstances of this collision somewhat like those of that at Ivanhoe, Ind., on June 1918, where Engineman Sargent, who was dozing in his cab at 4 a. m., reported that he had been out of bed since 5 a. m. of the day before.

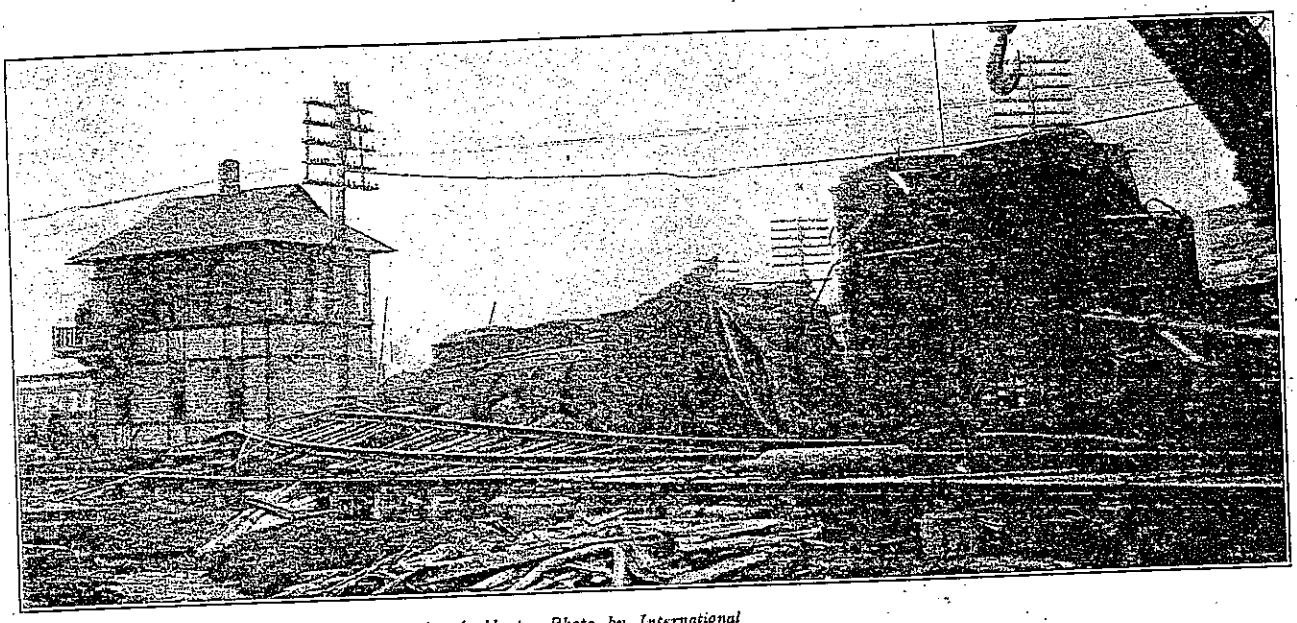
Fort Washington, Pa.

In a rear collision of passenger trains on the Philadelphia & Reading at Fort Washington, Pa., on the Bethlehem branch, five miles north of Jenkintown, and 16 miles north of Philadelphia, on the night of January 13, twelve passengers were killed and twenty or more were injured. The southbound local passenger train No. 381, which had been stopped by an obstruction on the line ahead, was run into at 7:40 p. m. by express No. 319, and the rear car of the standing train was completely crushed.

There was an enclosed-disk automatic block signal a distance in the rear of the standing train. It is claimed in behalf of the engineman of Train No. 319, that the signal indicated clear.

Photograph from Underwood & Underwood, N. Y.

Wreck at South Byron, New York, January 12.

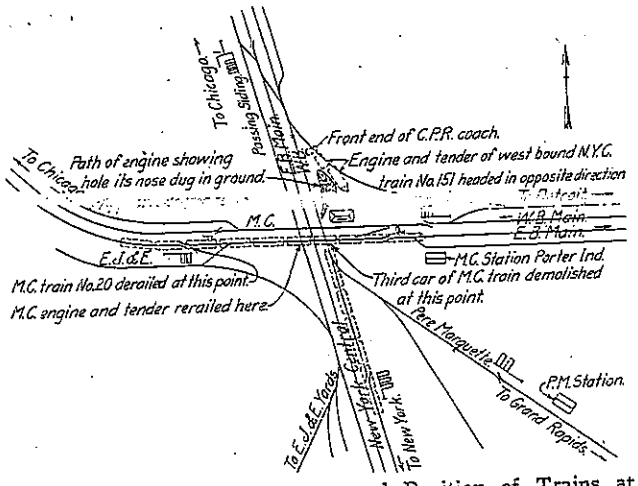


Position of New York Central Engine After the Accident. Photo by International

Passenger Trains in Disastrous Collision

Michigan Central Train Runs Over Derail Onto Crossing and New York Central Train Crashes Into It

ON SUNDAY EVENING, February 27, westbound New York Central passenger train No. 151 plowed through the third coach of eastbound Michigan Central train No. 20, at an interlocked crossing of these lines at Porter, Ind. Thirty-seven persons were killed and 4 seriously injured. Preliminary investigation indicates that the



Sketch Showing Track Layout and Position of Trains at Time of Accident

engineman on the Michigan Central train had run past a home interlocked signal in the stop position at a high rate of speed, his train being derailed on the split point derail which was open. After running on the ties for a distance of approximately 800 ft., the third coach of the train remained upright and standing directly on the crossing of the New York Central. The New York Central train, traveling at high speed, struck this coach, reducing it to a mass of kindling wood.

The trains involved in the collision were New York Central westbound passenger train No. 151, known as the "Interstate Express," and Michigan Central eastbound passenger train No. 20, known as the "Canadian." The accident happened on the crossing of the interlocking plant at Porter, Ind., 40 miles southeast of Chicago on the New York Central and 44 miles southeast of Chicago on the Michigan Central. Both trains were approaching the crossing at a high rate of speed. Investigation after the accident disclosed that the levers in the interlocking machine were in the proper position to permit of a westbound movement on the New York Central and that the routes on the Michigan Central were set against the passage of trains. The New York Central train No. 151 leaves Buffalo daily at 8:30 a. m. and is due to arrive in Chicago at 7:30 p. m. This train is scheduled to arrive at Porter, Ind. (Norwood), at 6:21 p. m.

Michigan Central train No. 20 leaves Chicago at 5:05 p. m., arriving at Windsor, Canada, at 1:45 a. m., where it is turned over to the Canadian Pacific for movement to Toronto, Montreal and points east. The train was made up largely of Canadian Pacific cars, the baggage car, smoker, day coach and three sleepers being Canadian Pacific equipment, while the diner and two sleepers were Michigan Central and Pullman equipment, respectively. This train was due to arrive at Porter at 6:16 p. m. and was running a few minutes late at the time of the accident. The schedule time of this train is 50 miles an hour between Hammond, Ind., and Michigan City. The schedule running time of the New York Central train between La Porte, Ind., and Englewood (Chicago), Ill., is 41 miles an hour.

At the point of the accident the Michigan Central tracks run almost due east and west. About 1,000 ft. west of the crossing there is a curve to the north of about 1 degree, after which the track is again tangent, while east of the crossing the track is tangent for some distance. The New York Central tracks at this point are tangent. The interlocking at this place is a mechanical plant equipped with electric route locking and approach indicators on both railroads and is

maintained by the New York Central. After the accident the levers in the machine were found in the proper position to give the New York Central train the route over the plant.

The preliminary investigation indicated that the engineman of the Michigan Central train ran past the eastbound home signal in the stop position and through the open derail. The train then ran on the ties for a distance of 300 ft., when the engine was rerailed on the crossing diamond, continuing across the crossing to a point where the day coach, Canadian Pacific 1560, the third in the train, was on the crossing of the westbound New York Central main when the New York Central train crashed into it. It was in this coach, which was of wooden construction, that the heaviest loss of life occurred. The impact of the New York Central engine was so great that the day coach was reduced to a mass of splinters, part of the wreckage breaking out the windows on the

Photo by International

The New York Central Locomotive and Splinters of Demolished Cars

south side of the interlocking tower as well as the siding in some places. One peculiarity of the accident was that those killed were mostly decapitated, and a number were mutilated so badly that identification was difficult. After the New York Central engine plowed through the day coach it left the track near the northwest corner of the tower and plowed into the ground, which was level at this point, digging a hole about 10 ft. deep. The momentum was so great that the engine and tender were turned completely around and over on their sides upon the wye connection between the New York Central and Michigan Central tracks, breaking and twisting the rails. The engineman and fireman of the New York Central train were killed and many of the passengers in the Michigan Central day coach were buried under the engine and tender. In this coach were between 60 and 80 passengers, many of whom were railroad employees returning to Michigan City, Ind., and Niles, Mich., after spending Sunday in Chicago.

An examination of the stock rail at the eastbound derail on the Michigan Central indicated that the top had rolled slightly and at the point where the wheels dropped to the ties the lower corner of the head was sheared. From this point for a distance of about 800 ft. the ties in this track were reduced to pulp. The crossing frogs were skewed, the lugs on several being broken and it was necessary to replace four of them.

After the accident Engineman Long of the wrecked Michigan Central train was reported as saying: "My fireman, Block, first sighted the signal that meant a clear track and called my attention to it. We were running at full speed and did not slow down when we were certain the signal was right. Proof that we were not to blame for the wreck is seen from the fact that the engine and one coach passed the derail. I will not state what I believe caused the wreck. The derail was locked and I could not be to blame."

Joseph Cook, the leverman on duty at the interlocking plant at the time of the accident, declared after the accident that Engineman Long ran by the home signal. The New Central train had been given the route, as its approach was announced first by the indicator in the tower. In his statement he said, "Under normal conditions the block is set against all trains. The train hitting the buzzer first is then given the right of way. * * *

"That is exactly what happened when the buzzer sounded yesterday. It showed that the New York Central train was the first to hit the buzzer by almost a full minute ahead of the Michigan Central flyer.

"I released the block which permitted the New York Central train to go through. Just as the train hit the crossing I saw the Michigan Central train coming around the curve at 60 miles an hour. I saw right away what was going to happen and thought the tower would be demolished. I called to Charlie Whitehead, the telegraph operator in the tower with me, and made for the steps which lead to the ground. The Michigan Central train by this time had hit the derail, which clearly showed that the block had been set against it and plowed over the ties and track, tearing them up as it went across the New York Central track. When the third coach of the Michigan Central train passed over

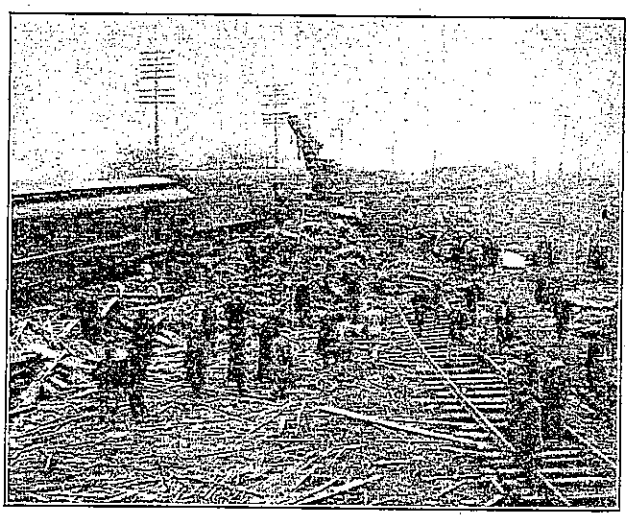


Photo by International

The Scene of the Collision at Porter, Ind., Showing the New York Central Locomotive

the New York Central right of way the New York Central train cut through it. As the locomotive of the New York Central train passed over the track it toppled over and the coaches of both trains were scattered in all directions.

"I cannot understand how the engineman of the Michigan Central train could have proceeded against the two blocks which were set against him. I can't help but feel that the engineman must have been asleep, for there are two blocks which are visible for almost a mile and half before he reached the crossing. I heard later that his fireman had admitted that the engineman disregarded the block. Investigation of the scene of the accident will show that the Michigan Central train hit the derail and the plowing up of the ties is conclusive proof that the blocks were correctly set."

In a statement issued by General Manager Henry Shearer of the New York Central at Chicago, it was said that "at

The Daily Standard.

Fair to-day and ... Tuesday—Stationary ... higher temperature.

PRICE O

ST. CATHARINES, MONDAY, MARCH 20, 1905.

...OE FACTORY

...issing — Twenty-... to be Dead.

...D FOLLOWED ...H DESTROYED ... AND SPREAD ... BUILDINGS ...ASS.

...arch 20.—A ...e R. B. Grover ... several employees ...ve been killed. Fire ...actory ... before 9 ... Grover plant had ... and the fire had ... business structures ... residences. ... March 20.—A ... at 9.30 of ... employees showed missing. The fire was ... and not under ... not spread ... fifteen minutes: ...ved at Brockton hospital ... to the effect that ... a score or more in... the injured had reach... ... that hour. ... now said that the ... search of the ... owing to the heat ... missing are estimated at 30. ... bodies ... been taken from the ... many cases

...T ALLAN THE PRINCIPAL GUEST

...e Toronto Board of ... to be at Banquet.

...e Nicholls, President of ... T. R., who was ex... principal guest at ... Trade banquet on ... has written that ... unable to be present. ... other prominent men ... among them, Mr. J. ... President of the Toronto ... Mr. H. N. Kitson, ... the Hamilton Board of ... John White, President of ... Board of Trade; Mr. ... sident of the Berlin ... and Joseph Stauf... of the Galt Board of ... These gentlemen have all ... their intentions to be pre... ... Allan will give an ad... Commercial Interests.

...G MAN IN BUSINESS.

... Practical Sermon Delivered ...

...was no chance for them unless they had a pull. What they needed was a push. Character and perseverance are a young man's capital. Young men sometimes thought one could not be in business and remain or be a staunch Christian, that business would lose if Christian principles were applied. This is not only ... true, but it is very ... If St. Catharines business men were all Christians and applied ... Golden Rule. If all the merchants and workmen were followers of the Lord, it would boom this city. It would raise the price of debentures, it would clean up old debts now marked N.G., it would clothe the naked and warm the cold and feed the poor. Men would not know this city in five years. It would be so prosperous and beautiful in life and architecture. The young men were urged to take Christ into partnership, and to depend upon it they would lose nothing by the transaction.

During the service three young men were baptized. The large choir sang in splendid style, Kipling's "Recessional."

THE FIGHT IS YET PROGRESSING

Growers Have Not Yet Received an Acceptable Offer.

THE $500 GRANT FROM COMBINE WAS TO INDUCE GROWERS TO CONTINUE TO GROW TOMATOES AT ... CENTS PER BUSHEL.

The fight between the canners' combine and the vegetable growers is not yet at an end, as was reported on Saturday. The combine has made representations to the growers, as stated, but the executive committee of the growers has authorized a statement to the effect that the combine has not offered to pay 30 cents per bushel for tomatoes. The offer to pay $500 into the funds of the growers' association was made with the understanding that tomatoes be grown at 25 cents per bushel as before.

This the growers believe to be one way of breaking up their organization, and of course refused the offer. A representative of the Grantham Growers' Association stated this morning that the fight is not a local one alone, but is a provincial struggle, and the local growers will not give in. The canners must pay 30 cents a bushel for tomatoes, or we will not grow them. Those who will sell at 25 cents will be very few indeed. I am surprised to see the enthusiasm and unanimity that there is among the growers on this question.

The Grantham growers have no further information at present to divulge. They will meet on Thursday evening in the Orange hall, when they will welcome growers from ... the situation

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LOCOMOTIVE INTO NIAGARA RIVER

Engine and Cars Jumped Snubbin Block at Bridgeburg.

MICHIGAN CENTRAL FREIGHT TRAIN'S EXPERIENCE — ENGINEER STUCK TO POST — MADE EVERY EFFORT TO STOP SPEED OF TRAIN, BUT HAD TO LEAP AT LAST.

Bridgeburg, March 19.—An engine and one car, part of a train of fifteen cars of dressed beef, plunged into the Niagara River about 7.30 o'clock last night close to the Canadian end of the International bridge. The train was on the Michigan Central tracks and was a Michigan Central train. It was approaching the bridge when the accident happened. There is a down grade just before the bridge is reached, and directly in front of the bridge is a switch leading to the old Baxter elevator. Whether the switch was open or not may not be determined until a later date, but it is certain the engine took the sidetrack and sailed down the hill leading to the elevator.

Engineer Delaney stuck to his post to the last, thinking to check the speed of his engine, but when he saw he could not he yelled to his fireman to jump and then jumped himself. Delaney is from St. Thomas, and is considered one of the most competent men on the Michigan Central. Conductor Higgins, of Bridgeburg, also jumped and escaped unhurt. The engine and one car jumped the snubbing block at the foot of the decline and plunged into the river.

Officials of the Grand Trunk last night said it was impossible to estimate the damage, but they did not think it would be large. They said the wonder was someone was not killed, and they emphasized their opinion of Delaney's pluck in sticking to his engine as long as he did.

The locomotive was a full-sized road engine of the type that is used on the Michigan Central, and the work of taking it out of the river will constitute a task which will require much time and effort.

The fire in the boiler was extinguished almost immediately after the locomotive broke through the ice, and there was no explosion.

SUPERIOR MERIT

Remarkable Curative Properties of a Remedy for Indigestion and Stomach Weakness.

Stuart's Dyspepsia Tablets, a preparation for the cure of dyspepsia and the various forms of indigestion and stomach trouble, owes its great success as a cure for these troubles to the fact that it is prepared for disease and weakness of the stomach and digestive organs only, and is not recommended or advised for any other disease.

... ... overall, but for any

A DEATH IN ENGLAND.

The Standard has received a copy of the South Eastern Gazette, of Maidstone, Kent, Eng., containing the following with reference to the death of a brother to Mr. Henry Hogben, of this city: "It is with regret we record the death of Mr. William Hogben, son of the late Mr. John and Mrs. Hogben, formerly of Poll-hill, Harrietsham. Like his father, Mr. W. J. Hogben served the parish as Churchwarden, etc. On retiring from business he settled down at Folkestone, where he was well known and much respected. He peacefully passed away on February 1st, after many weeks' illness, borne with patience to the last. The deceased gentleman was unmarried. The funeral took place on February 6th, at Newington, near Hythe, where several generations of his family are buried. Lovely wreaths of flowers were sent by numerous friends. Mr. Hogben was a keen sportsman of the old school, a capital shot, a fearless rider, and devoted to cricket, keeping up an excellent ground at Poll-hill for the village club."

A ROYAL BOOKLET.

The Grand Trunk Railway System are distributing a very handsome booklet descriptive of the Royal Muskoka Hotel, that is situated in Lake Rosseau, in the Muskoka Lakes, "Highlands of Ontario." The publication is one giving a full description of the attractions that may be found at this popular resort, handsomely illustrated with colored prints of lake and island scenery, the hotel itself and many of the special features that may be found there. It is printed on fine enamelled paper, bound in a cover giving the appearance of Morocco leather, with a picture of the hotel and surroundings ... embossed in high relief. A glance through the booklet makes one long for the pleasures of summer and outdoor life, and copies may be secured gratuitously by applying to A. Christie, C. P. & T. A., St. Catharines, or to J. D. McDonald, D.P.A., Toronto. m24

—The Standard was pleased to learn this afternoon that Mr. William Kirby's condition is slightly improved to-day. The veteran writer is putting up a sturdy fight.

FRUIT MEETIN... COME T...

A Large Gathering ... day Aftern...

EXCELLENT ADD... MR. MACOUN, ... AND MR. BROW... WARE—THE N... DILIGENT SP... DISEASES W... THE GRAPES.

The series of fru... ...ings held in this ... auspices of the ... United Fruit Grow... came to a successf... ...urday afternoon. ... tended meeting i... "Grape Diseases" ... were the subjects ... ably handled by ... of the Central E... at Ottawa, and M... Wyoming, Delaw... M. Honsberger w... in opening the m... that the Governm... appointed Andrew ... as the medium ... mixtures, etc., ... could be procured...

Mr. Macoun sp... dress being on d... He said that of ... district some ha... very much injur... and there was ... cases would spr... do great havoc ... of the Niagara ... disease once ge... is very hard to ... the carelessne... who neglect to ... yet time. Th... fungus diseases ... living plants ... ones. Howeve... ested in the d... plants, but ra... The disease ... recy and its ... covered mostly ...

The spore is ... tion of the ... spores are so ... not visible to ... sequently gro... overlook ther... provide for ... pest, they ca... tion of the ... under the ... in the crack... by and by ... the vineyard ... grape vines. ... minate in w... weather the ... which emph... spraying ca... the spores g... The spores ... the beginni...

Mr. Maco... the disease ... which was ... to spray f... the spores ...

which could be considered, and as they must be fully aware of the many projects which have been made public from time to time, it follows that, in their opinion, a union station is only possible at Windsor street or the Tunnel site. For the reasons given in the last paragraph, Windsor street, besides having other disabilities, is not in reality a union station.

The Tunnel site, on the other hand, possesses every attribute which a central station can have. Geographically, it is somewhat nearer to the trade centre of gravity. It is nearer to the commercial and the financial centres and nearer, also, to the more densely populated portion of the city lying between Victoria square and Mile End.

Where Should C.P.R. Participation Begin?

The objection of the C. P. R. to participating in a joint-station enterprise is understood to be based upon the fact that they already have a very serviceable terminus capable of being considerably extended, whereas the C. N. R. have little better than a lot of ramshackle buildings, woefully obsolete. In such conditions, would it be fair to ask the C. P. R. to embark upon, and pay half the cost of, a new station? Of course it would not! The C. P. R. share would take effect from the point at which the C. N. R. re-established its accommodation to an extent comparable with that at Windsor street. Another argument is that the government can enable the C. N. R. to carry out any scheme, even if an extravagant one, because it can provide the capital at the expense of the taxpayer, whereas the C. P. R. has to obtain new capital from its shareholders. Both these assumptions are perfectly true, but, really, they amount to one and the same thing, as will be shown. The source from which the capital comes is not important. Money is readily available everywhere if (1) the security is beyond doubt, and (2) the return thereon is good. In both railways, the security is first-class—the return comes from the population of Canada. The shareholder is the receiver, not the payer of the return, and whether that return comes from railway charges only, or from railway charges plus taxes, it amounts to the same thing—the public have to pay in any case, because the railway freighter, the taxpayer, the railway passenger, is one and the same—"the public."

Whatever may be the ultimate decision in regard to the concentration of all Montreal main line passenger service at the Tunnel station, there can be no two views about the desirability of, indeed the necessity for, grouping all C. N. R. trains at this place. Their present terminal accommodation has to be rebuilt in any event, and it is very little, if any, more costly to carry out the reconstruction in one place accessible to all sections of their undertaking, than to rebuild on the several existing station sites. Among the many advantages of following this course, not the least is the consequent abandonment of the use of the present line between St. Henri and Bonaventure station for passenger trains. It becomes much simpler to deal with that elimination of level crossings called much larger proposals now under consideration.

What will be the outcome? If the C. N. R. proceed to build a station for their own lines upon the Tunnel site they will naturally not only seek to provide a building worthy of the city but also to equip it with all the latest appliances which modern skill has devised for the convenience and comfort of passengers. Will a wealthy corporation like the C. P. R. be satisfied to take second place in the city in which they have always held a predominant position? Second place in the city, which is not only the financial centre of the company, but also the home of one-ninth of the population of Canada? Would it not be better to face the position boldly, and at once by deciding upon a union terminal station, and thus avoid the wasteful competition which will inevitably arise in the absence of co-operative effort?

Mr. Palmer in his report places great stress on the development of suburban traffic, facilities for which he finds a great need in Montreal. Such facilities, if provided, coupled with electrification, he believes would result in a tremendous increase in traffic. He summarizes his suggestions as follows:

It is absolutely necessary to provide suitable passenger station accommodation for the Canadian National to replace the obsolete buildings now in use.

The tunnel site affords by far the best means for developing this necessity.

This site affords possibilities of union terminal facilities which cannot be given at any other place, and it seems highly desirable that advantage be taken of this opportunity of concentrating passenger traffic.

The connection with the C. P. R. at the north end and with Place Viger creates a belt railway encircling the city, affording unrivalled facilities for development of suburban, or rapid-transit traffic.

To obtain the greatest advantage from this development of highly remunerative traffic it is essential that the railways on the Island be amalgamated and the passenger service electrified.

Such amalgamation should include freight traffic, in order that customers may despatch, or receive, goods by either railway at any depot and thus save cartage charges and congestion of city streets.

Consideration should be given to the further question of amalgamating under one control the transport facilities of the Island, including the harbor and the tramways.

To assist in arriving at a decision in this respect a committee might be constituted of one member representing each of the main interests involved, viz., the Canadian Pacific, the Canadian National, the harbor, the tramways, and the city, with a chairman appointed to act in an independent capacity.

The powers of this committee will only be advisory, as it is undesirable for amalgamation without mutual consent.

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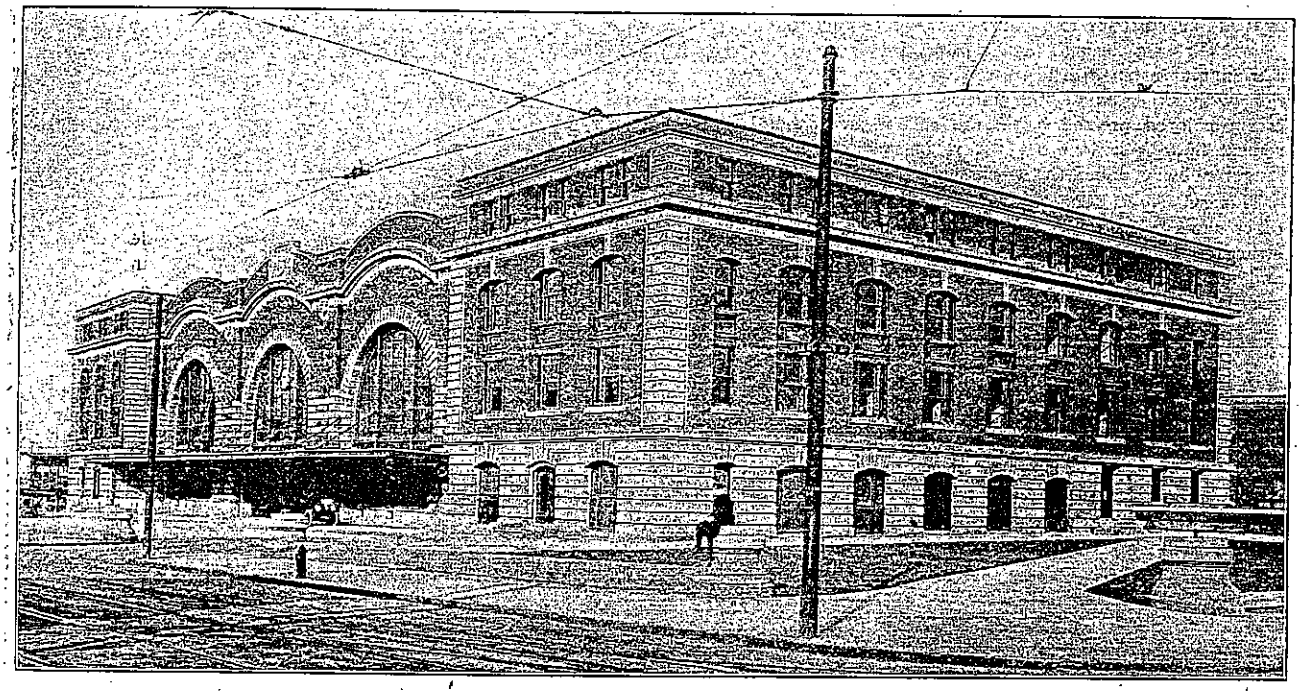
The New York Central's "Twentieth Century Limited" at Albany, N. Y.

New York Central Station at Rochester, N. Y.

Construction of New Building and Improved Passenger Facilities for a City of 240,000 Population

The new station of the New York Central & Hudson River, at Rochester, N. Y., which was opened January 19, as mentioned in the news columns of the *Railway Age Gazette*, adjoins and replaces the old station which had been in service about 31⅓ years. This station is used by all through trains on the New York Central main line as well as branch line trains on the Auburn road, the Rochester & Charlotte branch, the Rochester & Niagara Falls branch and the Ontario & St. Lawrence division, and the importance of this business warrants the large investment that has been made. The station is of the through type with 11 station tracks served by 6 platforms in addition to 2 through passenger and 2 freight tracks not adjacent to platforms. Each station track has a capacity of 14 cars. Stub tracks are provided at the ends of each platform for storage. The station platforms are reached from subways under the tracks. In addition to the station building, train platforms and track changes, the work has involved the construction of two new street bridges and the reconstruction of two old ones, the building of a power house, ice house, gas and oil house and service building.



An Exterior View of the New York Central Station at Rochester

The new building is located on a triangular piece of ground between Central avenue, Joseph avenue and the tracks. In order to utilize this property to the best advantage, the main station building, a rectangular structure about 260 ft. by 134 ft. was placed parallel to the street and the express building parallel to the tracks with its east end reaching to Joseph avenue. The entire space between these buildings and the tracks is enclosed and used in the main for the baggage room and passenger concourse.

The main entrance of the station is in the middle of the Central avenue side which is passed by a street car line and can be approached by carriages over a wide driveway. The main exit is at the west end of the concourse connecting to Clinton street, along which a cab stand is provided. Baggage, mail and express will be received and delivered in a large court at the east end between Joseph avenue and the station building.

The building is a steel frame structure carried on concrete piers with spread footings on hard pan that showed a supporting power of 15 tons per sq. ft. under test. The walls are of Medina sandstone up to the second floor level and of a reddish purple brick for the remaining height with Long Meadow sandstone trim. The roof over the waiting room is supported by four pairs of three-hinged steel arch trusses with a span of 90 ft. 8 in. The four-story portions of the structure at each end containing the office floors are severely plain in external treatment, but the waiting room portion which occupies the center of the building relieves this effect by the emphasis of the arch outline in the large windows and the roof. The entire length of this central portion of the building is covered by a heavy marquise above which is set a large clock.

The main waiting room is an unusually large and artistically finished room for a station of this size. It is about 90 ft. by 155 ft. and 54 ft. high, which is larger than the waiting room of the union station in St. Louis and about 70 per cent. as large as that in the new North Western station at Chicago. A broad stairway leads down from the main entrance to the waiting room floor which is 6 ft. below the level of the street in front of the building and about 9½ ft. below the base of rail on the station tracks. The room seats 440 people, the benches being double and enclosing the radiating surface of the heating system. They are surmounted by double bracketed electric reading lamps. The floor is terrazzo, the wainscoting Grueby tile, the walls tapestry brick and the arched ceiling Gustavino tile. By a skillful use of materials harmonizing in colors the room is given a warm, rich appearance without any suggestion of the ornate. The wainscoting is a deep brown with a border of green, blue and yellow. The walls are buff and the ceiling

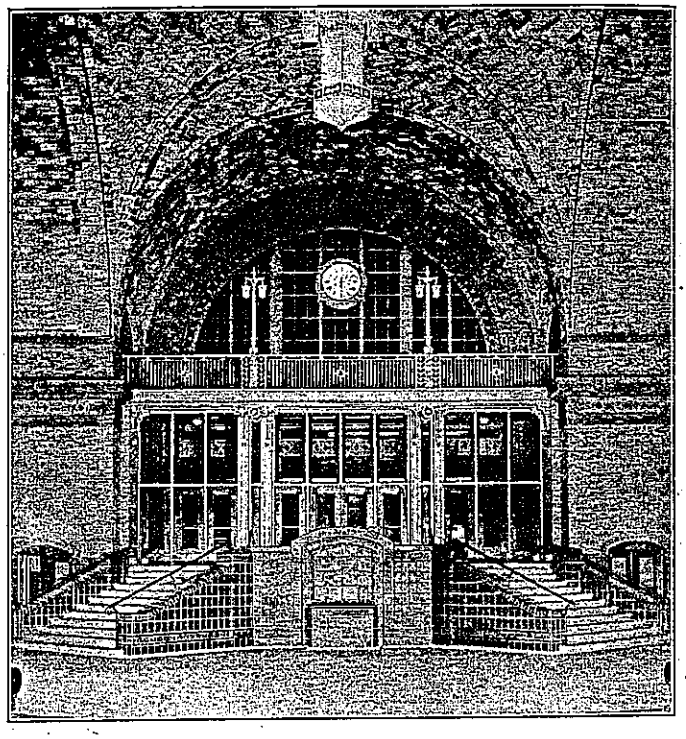
yellow, with traces of pink. Abundant light is secured through three large arched windows on each side and one at each end. In addition to the reading lights, three large bronze electroliers furnish artificial light.

Along the street side of the waiting room on either side of the main entrance are located the information and parcel rooms and the men's pay toilets. Directly across the room from the main entrance is the vestibuled entrance to the concourse. To the east of this entrance is the baggage checking counter which adjoins the baggage room on the rear. On the other side of the concourse entrance are the news stand, telegraph booth and a passageway from the concourse for the use of passengers coming from trains who want to enter the waiting rooms. At the west end of the waiting room are located the lunch room and dining room with the smoking room and men's free toilet in the corner next to the street. A row of telephone booths is placed along the wall between the entrances to the lunch room and dining room. At the opposite end of the waiting room is the ticket office and in the front corner on that end are the women's rooms and toilets. Quarters for a barber shop, the station master, the station police and a branch station of the post office are provided on a mezzanine floor around the waiting room.

Trains will be announced in the waiting room and passengers held at the entrance to the concourse until the arrival of their trains. Passing through this entrance, they reach the concourse, a triangular room with a flat ceiling of beam and slab construction with skylights in the panels. The walls are faced with cream colored pressed brick, the ceiling is plastered and the cement floor is laid on a slight ramp to connect with the passenger subway under the tracks.

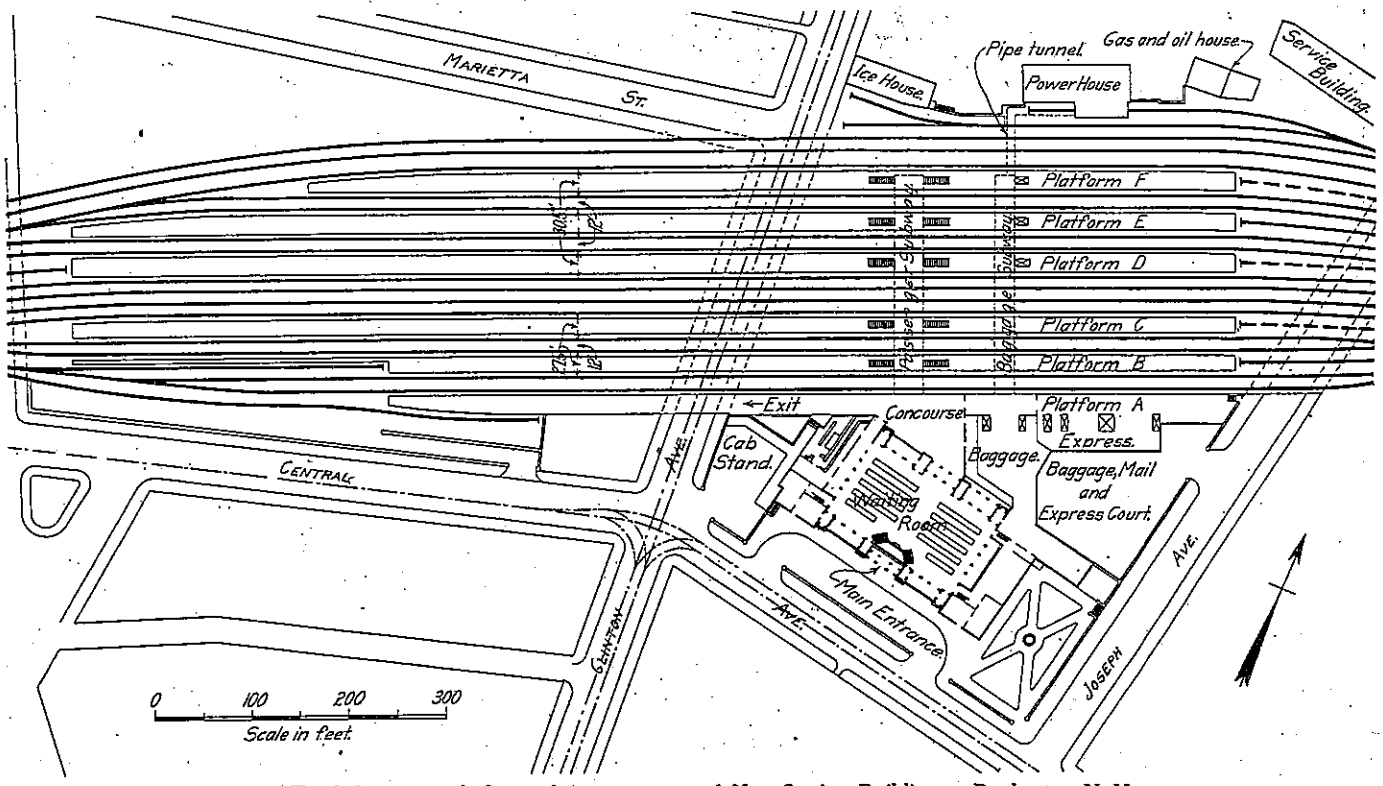
This subway is about 30 ft. wide and 8 ft. high with a row of columns down the center. It is of reinforced concrete construction with cream colored pressed brick facing on the walls and seats along both sides. Stairways lead up in both directions to the five island platforms. These platforms have a maximum length of 1,200 ft. and a maximum width of 20 ft. They are each covered for a portion of their length by steel frame canopies. A special hospital room is provided in the express building which can be reached from the first platform. This room is fitted with hot and cold water and all necessary first aid supplies.

The baggage, mail and express matter is trucked between



An Interior Detail of the Main Entrance

the respective quarters in the east end of the station and the express building and the three platforms serving westbound trains through a baggage subway under the tracks with elevators to each of these platforms. The three eastbound platforms are reached by trucking across the tracks at grade from the second floor of the express building. The baggage subway is 20 ft. wide and 9 ft. high, of concrete construction throughout.

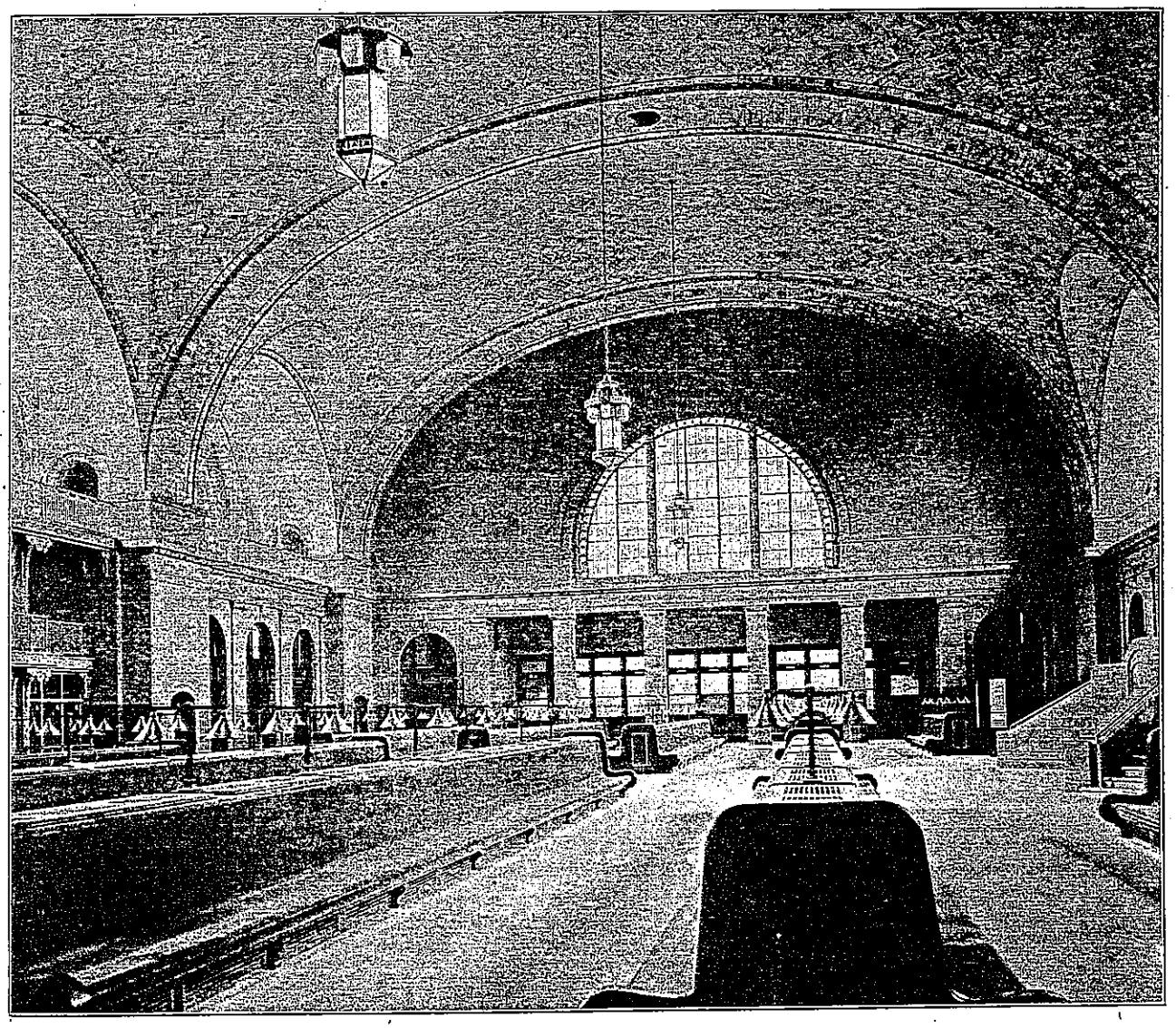


Track Layout and General Arrangement of New Station Building at Rochester, N. Y.

There are three office floors in each end of the main building providing accommodations for all of the company's local offices. These floors can be reached either directly from the street or from either end of the waiting room. The offices are located along the outer face of the building with a corridor through the middle and file rooms adjacent to the light court which separates the upper floors from the ends of the main waiting room. All offices are finished in oak with plaster walls and ceilings.

The power house is located across the track, directly north of the station. It is a brick building about 40 ft. by 110 ft. in size with steel trusses supporting a concrete slab roof. Coal is dumped from an elevated track into storage bins in front of the three 200 h. p. boilers. The ashes are dumped into hoppers under the front of the boilers and then into skips which elevate them to bins over the coal tracks. Provision has been made in the design of the bunkers for the installation of another battery of boilers. The engine room equipment includes two steam turbines to circulate the hot water for the heating system, two pumps for supplying the hydraulic elevators, one pump for domestic water and two for boiler feed water, a six-sweeper steam driven vacuum cleaning plant, a fire pump and a 15-ton Whiting crane.

All pipes are carried from the power house to the station building in a pipe tunnel 7 ft. 6 in. by 8 ft., located under the baggage tunnel, with branches extending under the main building and under the express building. Drinking water which is taken from the city mains is cooled in an icing tank in this tunnel and circulated to fountains in the station. Electric power for lighting and operating the electric elevators and other motor driven apparatus is bought from the local public service company and is distributed from a terminal board in the tunnel. A separate emergency electricity supply is brought in at the west end of the building and a separate conduit carries the telephone and telegraph wires. The clock system of the entire terminal is controlled from a master clock in the despatcher's office. Ventilating fans with a suction system for all toilets are located in the pipe galleries under the station. All sewage is collected to a 4-ft. stone arch sewer carried under the tracks to a connection with the city system.



A General View of the Waiting Room, Which is the Principal Feature of the New Building

The design and construction of this new station was handled under the direction of the engineering department of the New York Central, of which G. W. Kittredge is chief engineer; C. J. Parker, principal assistant engineer; J. W. Pfau, engineer of construction; D. R. Collin, architect; F. E. Paradis, district engineer, and J. B. Reinhardt, resident engineer. The company's architect was assisted by Claude F. Bragdon, Rochester. The general contract was let to Gorsline & Swan Construction Co., Rochester, and work was begun on August 30, 1910.

LIFT BRIDGES OVER THE BUFFALO RIVER.

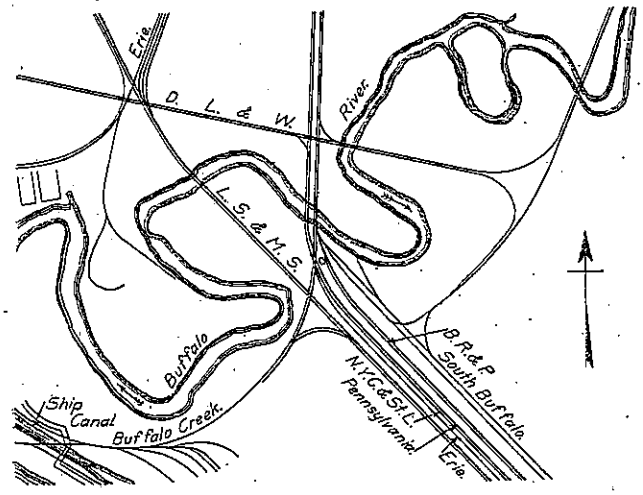
The Construction of Three Movable Bridges Replacing Fixed Spans to Allow Navigation of a River at Buffalo.

By Emile Low.*

The main harbor of the city of Buffalo comprises the Buffalo river and the City Ship canal, the former a natural stream, and the latter an artificial waterway. From a stream originally less than 10 ft. deep, the Buffalo river has gradually been deepened by dredging to 23 ft. below mean lake level, this depth now being available at the Lake Shore & Michigan Southern bridge. A contract for deepening the river to 23 ft. above this bridge has been let to the Great Lakes Dredge & Dock Company, Chicago, and in order to utilize this section for navigation and industrial purposes, movable bridges are being substituted for the present fixed spans. Work is now in progress on three railway bridges used by five roads, the Lake Shore & Michigan Southern, the New York, Chicago & St. Louis, the Pennsylvania, the Buffalo Creek, and the Buffalo, Rochester & Pittsburgh.

LAKE SHORE & MICHIGAN SOUTHERN BRIDGE.

The previous crossing of the Lake Shore & Michigan Southern comprised two fixed spans of 110 ft. each. As the new bridge is to occupy the site of the old one, a temporary double track pile bent trestle with three plate girder spans was built south of and parallel to the old bridge. At the bridge crossing, solid limestone is found at an elevation about 36 ft. below mean water level. The abutments rest on pile foundations, 30 ft. piles being driven to rock. The substructure comprises two abutments, A at the west end and B at the east end, and four piers Nos. 1, 2, 3 and 4. The substructure is of 1:2½:5 concrete. The entire



Location of Three New Movable Bridges Over the Buffalo River.

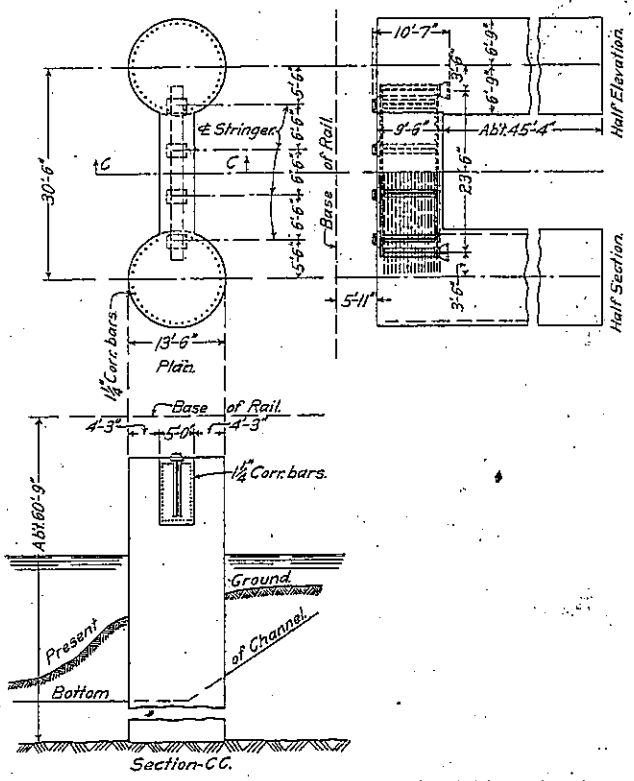
structure with the exception of the steel work is being built by company forces.

The following table shows the approximate estimate of materials required in the foundation:

	Concrete.				Reinforcement.					
	Total Yardage.	Cement. Sacks.	Sand. Cu.yds.	Broken Stone. Cu.yds.	Piles.	¾ in. sq. Lin.ft.	1¼ in. sq. Lin.ft.	Cross Girders.	Castings.	
West Abut. A.	390	2,030	180	360	80	760	...	...	...	...
Pier 1	590	3,070	270	540	...	...	6,480	1	2	4
Pier 2	590	3,070	270	540	...	260	6,240	...	...	...
Pier 3	620	3,225	285	570	...	...	6,240	1	2	...
Pier 4	620	3,225	285	570	...	...	6,240	1	2	4
East Abut. B.	370	1,925	170	340	75	760	...	...	...	...
Total	3,180	16,545	1,460	2,920	155	1,780	25,200	3	6	8

*Consulting Engineer, Buffalo, N. Y.

The two abutments are of the U type, with battered front faces and vertical backs, abutment B being at right angles to the center line, and abutment A having a skew of 79 deg. 16 min. 38 sec. The respective heights are 28 ft. 3½ in., and 27 ft. 8¼ in. Abutment B has 75 supporting piles in 5 rows of 15 each. The foundation course is 15 ft. 6 in. wide, 38 ft. long and 4 ft. 6 in. high. The height of the retaining wall above the foundation



Details of Cylinder Piers for Lake Shore & Michigan Southern Bridge.

course for abutment B is 23 ft. 9½ in., and the bottom thickness, 12 ft. 6 in., a little less than half the height. The U stems are very short, only 4 ft. The embankment will spill around the abutments in the usual manner. The only reinforcement in the U abutments is in the foundation course, there being 76 corrugated bars, ¾ in. sq. and 10 ft. long, spaced 6 in. center to center. The piles project into the foundation course 12 in., and the corrugated bars are laid in a row 3 in. above the tops of the piles.

The piers are concrete cylinders in pairs. Piers 1 and 2 are on a skew of 79 deg. 16 min. 38 sec. from the center line. Piers 3 and 4 are at right angles to the center line. The height of the cylinders varies from 51 to 52 ft., owing to the variation in the level of bed rock. The diameter of the cylinders is 13 ft. 6 in., and the distance between their centers is 30 ft. 6 in. at right angles to the center line. The cylinders are connected at the top by reinforced concrete girders or struts, 9 ft. 6 in. deep. The width for pier 1 is 5 ft. 6 in., and for piers 2, 3 and 4, 5 ft. The reinforcement for each cylinder consists of 80 corrugated bars, 1¼ in. square, 30 ft. long, placed vertically in the periphery and 6 in. back from the face. The spacing is approximately 12 in. center to center. In addition, the tops of the cylinders or

pier 2 are reinforced by 52 corrugated bars ¾ in. square, 5 ft. long, placed vertically in the line of the diameter and at right angles to the center line.

The strut connecting the cylinders of pier 2 is reinforced by 48 corrugated bars, 1¼ in. square, 30 ft. long, placed 6 in. from the side and bottom faces and 12 in. below the top faces. The spacing is about 6 in. center to center. The struts in piers 1, 3 and 4 contain an imbedded steel plate girder. Pier 1 contains 56 corrugated bars, 1¼ in. square, 30 ft. long and piers 3 and 5 have 48 bars of the same dimensions. The plate girders are 25 ft. long and 8 ft. high, and rest on cast iron pedestals imbedded in the concrete at the proper elevation. The plate girders also carry the pedestals supporting the superstructure.

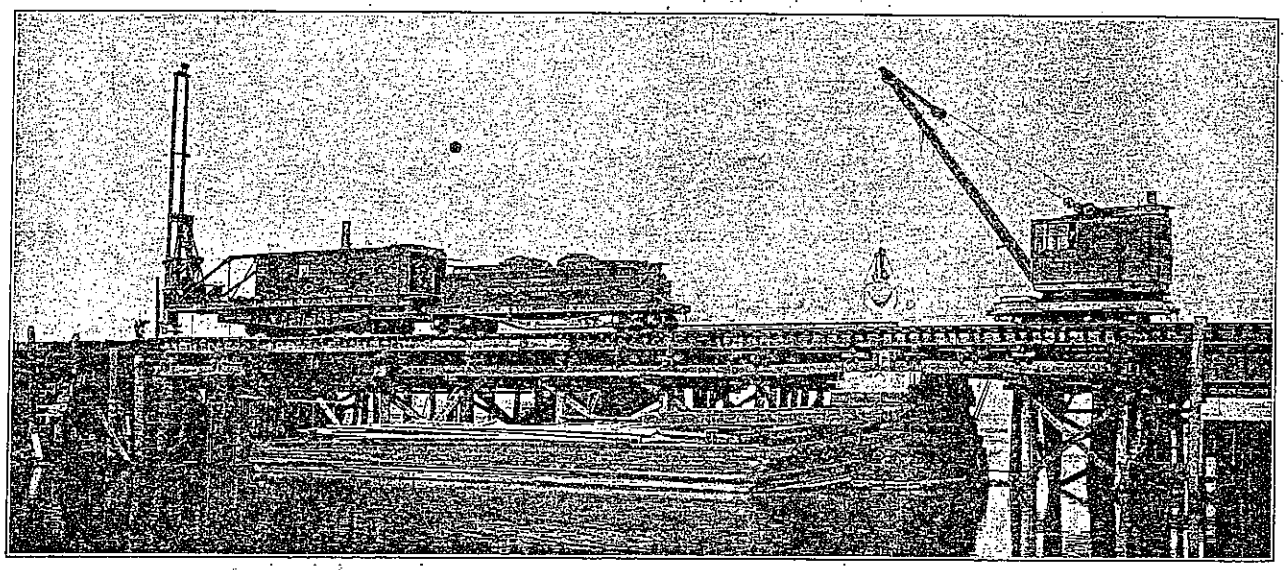
The cylindrical piers were constructed inside circular cofferdams composed of Lackawanna arched-web steel sheet piling. The light section was used, each piece building 14 in. of wall, and weighing 35 lbs. per sq. ft. of wall. The weight per lineal foot of piling bar is 40.83 lbs. Each cylinder, 18 ft. in diameter, consisted of 50 sheet piles, each 45 ft. long. To furnish a template or guide for driving the cylinders, five wooden piles were first driven, one in the center, and four at the corners of an inscribed square. Diagonal braces connected the circumferential piles, crossing at the center pile. A circular wooden frame or ring, 6 in. deep, and made up of three layers of 2 in. lumber was then attached to the top of the piles, around the outside of which the steel sheet piles were driven.

The steel sheet piling was driven by a revolving pile driver mounted on a suitable car body or frame. A special tender accompanied the pile driver, supplying water and fuel. The enclosed material in the steel cylinders was removed by an orange peel dipper operated by a revolving derrick, mounted on a car, the excavation being completed while the cylinder was filled with water. Owing to the hardness of the material immediately overlying the bedrock, a layer of several feet in thickness had to be left in for future removal.

The next work was to brace the interior of the cylinders to prevent collapse when the water should be pumped out. This was accomplished by building heavy circular frames or rings of timber made up of two courses of old 9 in. x 18 in. stringers, bolted together. The frames were 17 ft. 6 in. in diameter, with a central opening 10 ft. 6 in. square. Four hook eyes were placed at the corners of the square for handling.

These heavy frames were placed in the cylinders by the revolving derrick, large vertical posts, about 5 ft. high, securely held by diagonal bracing or inclined struts, having first been attached to the top of the first one. A second ring or frame was then laid on top of the posts of the first one and both were driven down by the pile driver. This procedure was repeated until five frames had been driven in place, the lowest one being stopped about 5 ft. above bedrock by the remaining material. The cylinder was then pumped out and the remaining material down to bedrock removed in large buckets. Octagonal forms were then built inside the cylinders, resting on the bedrock, which were filled with concrete dumped into vertical chutes reaching to the bottom.

After the foundation had been placed, the lower frame was removed and another course of concrete added, octagonal in cross-section as before. At an elevation of about 21 ft. below the completed top of the cylinder (or about 5 ft. below water level) the cross-section was changed to a circle. The octagonal forms were left in place. The forms for the upper parts of the piers were built at Collinwood, Ohio, near Cleveland, and consisted of staves 10 ft. 6 in. long held in place by three hoops. To prevent deformation during transportation and handling, temporary rings were placed in the interior which were removed after the forms were placed in position on the octagonal foundation courses. The forms were built similar to a water tank, but without a bottom. There were 100 staves in each, each stave being 5¼ in. wide and 2¾ in. thick. The diameter of the forms was 13 ft. 6 in., the same as that of the finished pier. Two forms in height were used, the upper one having suitable openings on one side to allow the placing of the steel plate and reinforced concrete girder connecting the upper portion of the two cylinders forming each pair.

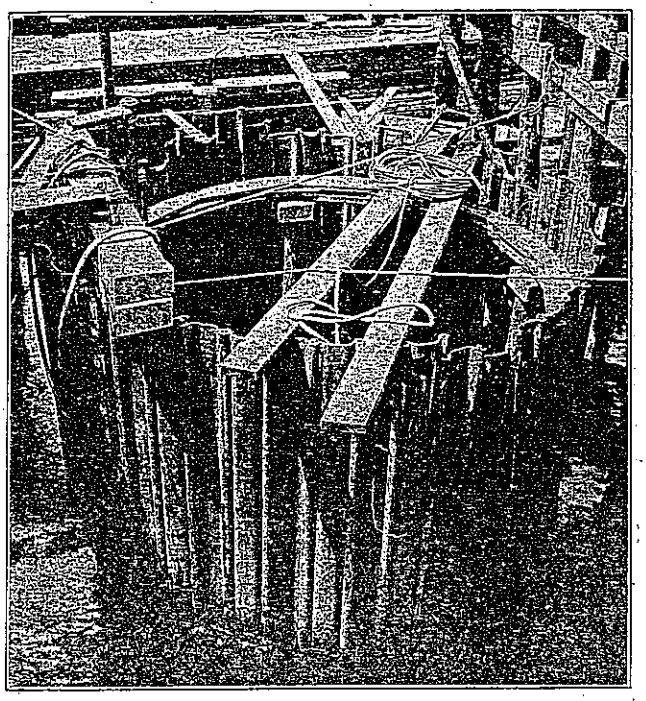


Track Pile Driver and McMyler Derrick With Orange Peel Bucket; Lake Shore & Michigan Southern.

The concrete mixing plant was installed on three flat cars. On one were built the storage bins for holding the sand and broken stone, with a platform for the cement. Another carried the inclined plane up which the loaded material car was run to the mixer, which was installed on a third car. The mixer is one built by the railway company and is a cylinder revolved in a vertical plane. It has two openings, opposite to each other and closed by hinged doors. The concrete materials are dumped into a chute above, dropping into the mixer; the door is closed and the mixer revolved a sufficient number of times; the lower door is then opened and the mixed concrete allowed to drop into a chute under the car and leading to the work. The concrete is made in large batches, the charging car having a capacity of about 31 cu. ft. Usually a batch contains 5 bags of cement, more being used for foundation work than above ground and water.

The sand for concrete was obtained from pits at Irvington, on the shore of Lake Erie, 28 miles west of Buffalo, and the broken limestone, partly from Kelley Island, in Lake Erie, near Sandusky, Ohio, and partly from Akron, N. Y., 22 miles east of Buffalo. The engineering department of the Lake Shore & Michigan Southern prefers broken stone to a natural mixture of sand and gravel, owing to the difficulty of securing a properly graded mixture.

The superstructure consists of a 50 ft. deck girder, a 112 ft. 6 in. through girder, a Strauss trunnion bascule bridge with a movable span of 131 ft. 6 in., and a tower span of 49 ft., and a 56 ft. deck girder in the order named going east, all spans being double track. The front end floor beam is on a slight skew,



Circular Cofferdam of Lackawanna Arched Web Steel Sheet Piling Showing Template Around Which Piles Are Driven; Lake Shore & Michigan Southern.

while the trunnion end of the bridge is of necessity square. One bottom chord is therefore slightly longer than the other, while the top chords are of equal length.

The bridge is operated by means of two pinions, one on each side, turning in bearings secured to the tower, which engage cast steel racks bolted to the operating struts. The operating machinery consists of two 50 h. p., a. c. motors connected to the operating pinions through a train of reduction gears and an equalizing gear. The motors are each provided with a solenoid brake, and one motor driven emergency brake, which is normally set, is provided. This brake is released by a motor, and is held in release as long as current is applied to this motor. Cutting off the current, or any failure of current will result in the instantaneous application of the brake. The emergency brake may also be released mechanically when the bridge is to be operated by hand. In addition to electrical operation, hand operation is also provided for. By means of hand cranks placed in the tower, the operating machinery can be actuated by two men. The operator's house is located on shore close to the bridge and contains the controllers for the leaf motors and other electrical apparatus and indicating devices.

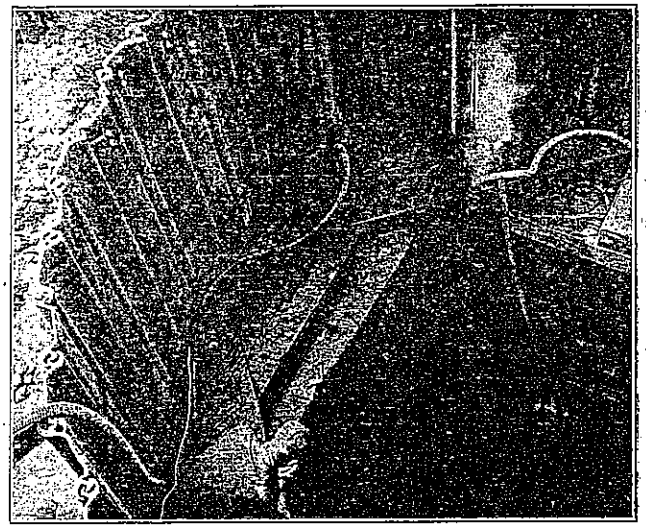
The break in the floor between the fixed portion and the moving leaf is located in front of the main trunnion, and the live load, therefore, does not tend to open the bridge. Front end locks are provided, however, which hold the bridge firmly to the rest pier. The movement of the latch bars automatically stops the motors and sets their brakes at each end of their travel. Hand operation is also provided for operating the locks in case of emergency. The operating and lock motor circuits are connected with the interlocking system, so that current is not available for operation until the signals have been set at "danger," and these signals cannot be set at "clear" until the bridge is closed and the locks driven in. In like manner current is not available for the leaf motors until the locks have been withdrawn.

An automatic cut-off is provided which will throw the circuit breakers out and cut off the current from the leaf motors and set their brakes when the bridge has reached the nearly fully open position. A foot switch is provided, which will enable the operator to release the motor brakes and allow the bridge to "coast" if desired. In closing the bridge current is available to hold the leaf down firmly on its seat until the locks are fully driven in. Mechanical indicators will be located at the pivot end and front end of the bridge, placed on the stationary and movable parts, so that they can be seen from the operator's house, and to which the operator can sight and thus determine the nearly closed and open positions of the bridge. Electric light indicators are also provided in the operator's house showing the operator the various positions of the locks and the bridge leaf. The movements of the locks and bridge itself open and close the circuits of these indicator lights.

This bridge was designed by B. R. Leffler, bridge engineer, and is being built under the supervision of G. C. Cleveland, chief engineer of the Lake Shore & Michigan Southern.

THE BUFFALO CREEK RAILROAD BRIDGE.

This bridge lies about 2,000 ft. southeast of the Lake Shore & Michigan Southern bridge, and about 100 ft. east of the



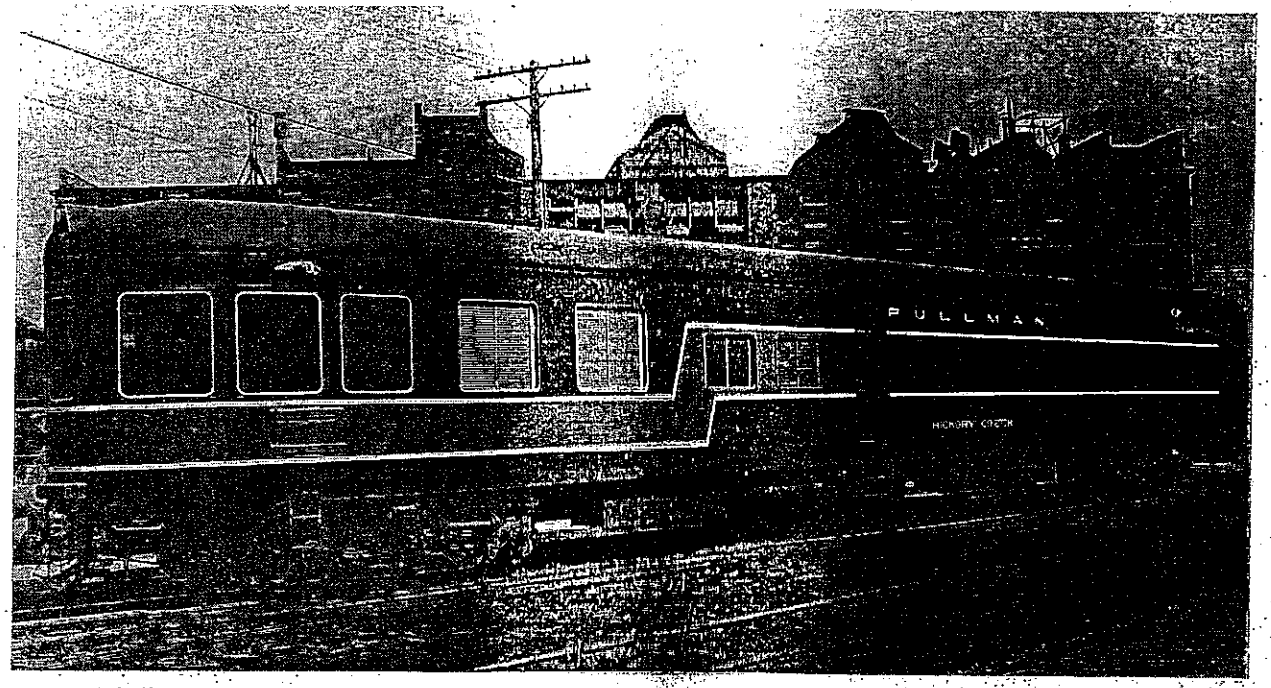
Interior View of Cofferdam Steel Sheet Piling With Timber Ring In Place for Bracing Against Water Pressure; Lake Shore & Michigan Southern.

bridge used by the New York, Chicago & St. Louis and the Pennsylvania. It consists of four spans, a Strauss bascule span 213.5 ft. long, two through plate girder spans, 89 and 88.5 ft. respectively, and one deck plate girder span, 38 ft. long, the total length between back wall faces being 429 ft. There are two abutments and three piers, abutment 1 and pier 2 being at right angles to the center line, and piers 3, 4 and 5, and abutment 6 having a skew of 54 deg. 53 min. 30 sec. The elevation of bedrock is about 47 ft. below mean lake level.

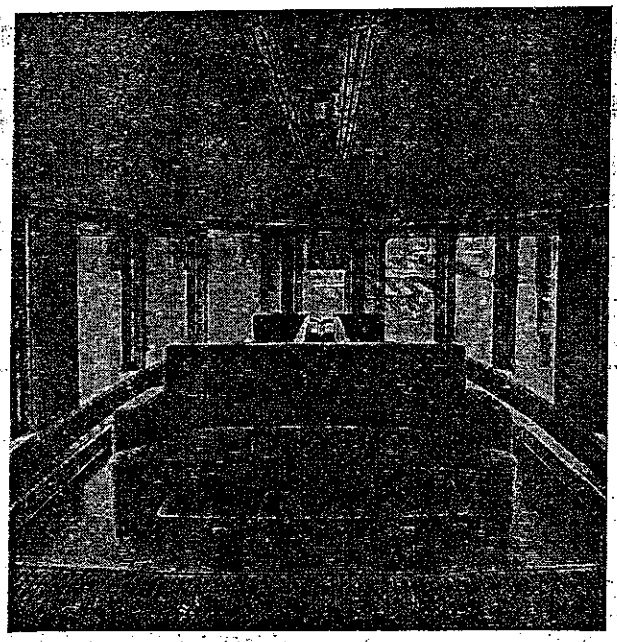
The concrete piers are supported by bearing piles driven to bedrock. The piles of piers 2, 3, 4 and 5 are 25 ft. long, and of abutment 1, 30 ft. long. The foundation of abutment 1, and

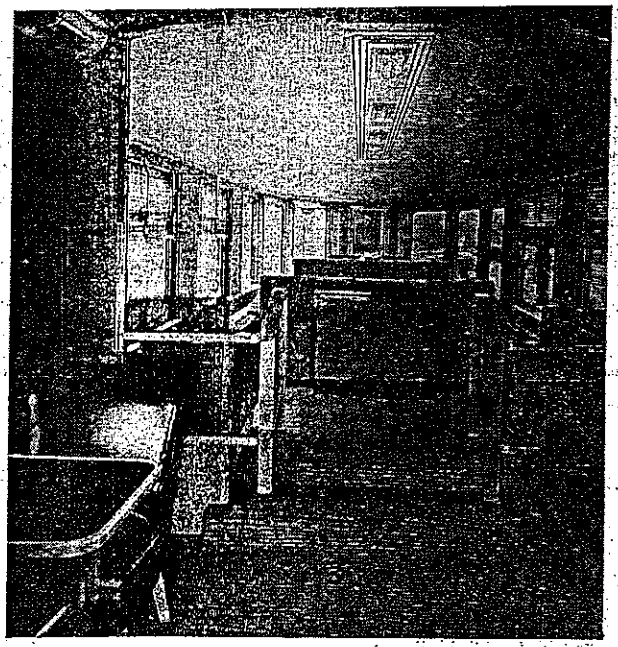
NEW YORK CENTRAL'S "TWENTIETH

As part of its 86-million-dollar, postwar, new passenger-equipment program, the New York Central inaugurated on September 15, with appropriate ceremonies at New York and Chicago, two completely new "Twentieth Century Limited" trains. This event was reported in the *Railway Age* of September 18. Each of the new trains, normally comprising about 16 all-room sleeping cars, built by the Pullman-Standard



Large rear observation windows and streamlining of the Lookout Lounge car





Left — The observation end of the Lookout Lounge car. Right —The double step-up from cocktail section to raised Lookout Lounge

CENTURY LIMITED" TRAINS ARE NEWLY EQUIPPED

Each of two new streamline all-room "Centuries," including Diesel locomotive, cost about two million dollars

Manufacturing Company, and an Electro-Motive 4,000-hp., two-unit Diesel locomotive, cost about $2,000,000. The cars, constructed of welded low-alloy high-tensile steel, were designed by the car builder in co-operation with New York Central engineers, and the interior decorative treatment was developed by Henry Dreyfuss, industrial designer, New York.

Sleeping accommodations on the new 16-car "Century" comprise 137 units with 253 beds. In addition to the railway post-office car, equipment in the train includes the following types: 22-roomette; 10-roomette and 6-double-bedrooms; 12-double-bedrooms; a full-length diner; kitchen-dormitory; lounge-barber-secretary, or club car; and 5-double-bedroom-lounge-observation, called the "Lookout Lounge."

The new "Century" is said to provide the longest stretch of train radio-telephone service in the world, operating all the way between New York and Buffalo, N. Y. The cars are equipped with an intercar dial telephone and a public-address system, pneumatic and electric-eye operated doors, and foam rubber mattresses. In the all-room sleeping cars, each room has circulating ice water, electrical appliance outlets, and lavatory (washing) facilities. All bedrooms (not roomettes) have, in addition, separate toilet-lavatory rooms, connected to each room. Porters have their own sleeping accommodations in each car. A train secretary and barber are available.

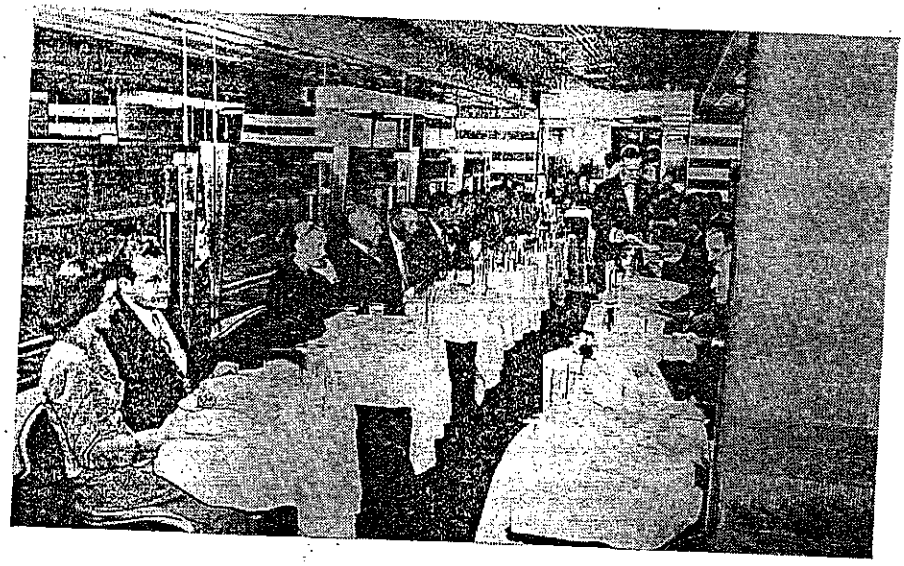
All lighting is fluorescent, direct or indirect, operating on a special N.Y.C.-designed circuit from a 64-volt battery system without motor alternator or other converter. T-12, 15-in., 14-watt and T-8, 12-in., 14-watt bulbs are used almost exclusively.

Lighting Equipment

The lighting in the sleeping cars was developed through close collaboration between New York Central and Luminator, Inc. The fixture finally developed is similar to a luminous moulding and is located in the corner directly over the seats. The high-intensity beam of light is directed through a clear condensing lens to the reading plane, while the diffused area immediately above the lens provides the general illumination for an extremely cheerful interior.

Lighting in the bedroom with the bed crosswise consists of a five-light unit in the form of a letter L. It is so wired that when the occupant of the upper berth wishes to read, he can turn out the four bulbs running across the car and use only the short length fixture directly over his head as a night reading light. Provision is made for a blue night light as well. For the

ATED BY NEW YORK CENTRAL



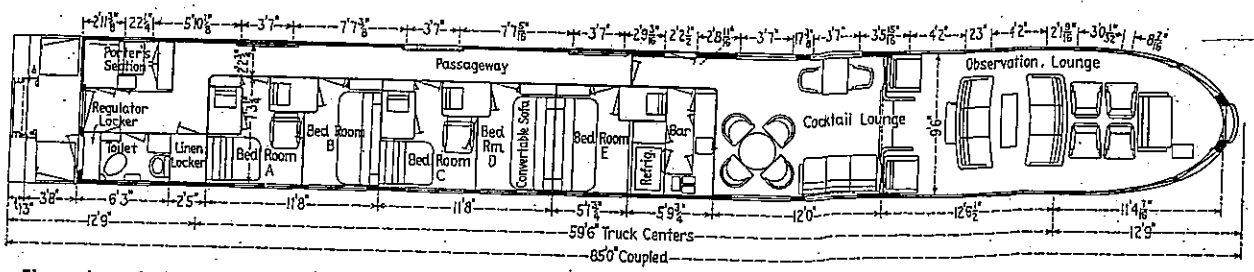
The center section of the full-length diner offers continuous serpentine sofa seating arrangements

The first run of the New York Central's new "Twentieth Century Limited" was made on September 17. Placed on public view on September 16 in New York and Chicago, the all-room, 16-car twin trains, designed by the Pullman-Standard Car Manufacturing Company in cooperation with the road's equipment engineering department, had been christened the previous day in simultaneous ceremonies in both cities. General Dwight D. Eisenhower was the principal speaker at the New York christening and Governor Dwight H. Green of Illinois performed a similar role in Chicago.

One major innovation on the new twin streamliners is what is described as the world's longest stretch of train-radio-telephone service, in operation over the 436-mi. between New York and Buffalo. Passengers in either direction may telephone any place in the world, through links with "land" radio stations, largely those of the Bell system. Later, as more radio-telephone relay stations are built, this service will be extended between Buffalo and Chicago. The radio-telephone is located in the club car, in the center of the train, which also features a completely equipped barber and valet shop, with shower bath, a train secretary's office and lounge facilities with buffet.

Other new features on the trains, each of which carries 44 crew members, include pneumatically operated car-to-car doors that swing open at a touch and close automatically, inter-car dial telephone service, complete fluorescent lighting and a raised platform lookout lounge-observation car with extra-high windows. The all-room sleeping cars have circulating ice water in every room and each of the double bedrooms has an adjoining private toilet and washroom. Passengers may control air-conditioning and heating to their individual tastes. (A description of the new "Century" will appear in an early issue of *Railway Age*.)

Lighting in the roomettes, as elsewhere on the train, is of the direct-indirect fluorescent type



Floor plan of the Lookout Lounge car

Partial List of Materials and Equipment on the New N.Y.C. "Twentieth Century Limited" Trains

Trucks	General Steel Castings Corp., Granite City, Ill.
Truck springs	Crucible Steel Company of America, New York
Truck locking center pins; side bearings	W. H. Miner, Inc., Chicago
Roller bearings with hot-box alarms	Hyatt Bearings Div., General Motors Corp., Harrison, N. J. Timken Roller Bearing Co., Canton, Ohio
Wheels	Armco Steel Corp., Middletown, Ohio Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Axles	Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Shock absorbers	Houde Engineering Div. of Houdaille-Hershey Corp., Buffalo, N. Y.
Draft gear	Waugh Equipment Co., New York
Couplers and unlocking mechanism; coupler yokes	National Malleable & Steel Castings Co., Cleveland, Ohio
Center-plate, body side-bearing, equalizer coil spring, and journal-box pads	Fabreeka Products Co., Boston, Mass.
Air brakes	New York Air Brake Co., New York
Clasp brakes	American Steel Foundries, Chicago
Brake shoes	American Brake Shoe Co., New York
Hand brakes	National Brake Co., New York
Steel plates and sheets	Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Platform floor covering	Alan Wood Steel Co., Conshohocken, Pa.
Flooring, composition:	
In kitchens	Crossfield Products Corp., Brooklyn, N. Y.
Except in kitchens	Tuco Products Corp., New York
Window sash	Adams & Westlake Co., Elkhart, Ind. (lounge sleepers) O. M. Edwards Co., Syracuse, N. Y. (room sleepers) Libby-Owens-Ford Glass Co., Toledo, Ohio
Glass	Pittsburgh Plate Glass Co., Pittsburgh, Pa. Libby-Owens-Ford Co., Toledo, Ohio
Vestibule curtains	Morton Mfg. Co., Chicago
Window-sill capping	Formica Insulating Co., Cincinnati, Ohio
Insulmat	J. W. Mortell Co., Kankakee, Ill.
Insulation	Gustin-Bacon Mfg. Co., Kansas City, Mo.
Motor generator for lighting and electric motors	General Electric Co., Schenectady, N. Y.
Motor generator drive	Spicer Mfg. Corp., Toledo, Ohio
Voltage regulators	Safety Car Heating & Lighting Co., New York
Storage batteries	Gould Storage Battery Corp., Depew, N. Y. K. W. Battery Co., Chicago
Train-line jumpers for batteries; charging receptacles	Pyle-National Co., Chicago
Train-line jumpers for radio and telephone inter-car connections	Mines Equipment Co., St. Louis, Mo.
Inverters for electric razors	Cornell-Dubilier Electric Corp., South Plainfield, N. J.
Steam heat and controls	Vapor Heating Corp., Chicago
Flexible metallic heat connectors	Barco Manufacturing Co., Chicago Vapor Heating Corp., Chicago
Heat specialties	Vapor Heating Corp., Chicago
Steam-pipe covering and fittings	Johns-Manville Corp., New York
Air conditioning; mechanical refrigeration kitchens, diners and bars	Frigidaire Div., General Motors Corp., Dayton, Ohio
Air filters	Air Maze Corp., Cleveland, Ohio
Recirculated air grilles	Barber-Colman Co., Rockford, Ill.
Air diffusers (rooms)	Anemostat Corp. of America, New York
(open cars)	E. A. Lundy Co., New York
Exhaust fans for discharging air from refrigerator units	L. J. Wing Mfg. Co., New York
Exhaust and blower fans for kitchen and pantry	Westinghouse Electric Corp., Pittsburgh, Pa.
Kitchen, bar room, and pantry equipment	Angelo Colonna, Philadelphia, Pa.
Furniture in lounge	S. Karpen & Bros., Chicago
Dining-car chairs; folding chairs in sleeping rooms	General Fireproofing Co., Youngstown, Ohio
Upholstery	Goodall Fabrics, Inc., New York Massachusettes Mohair Plush Co., Boston, Mass. Shelton Looms, New York
Leather	Cleveland Tanning Co., Cleveland, Ohio Eagle-Ottawa Leather Co., Grand Haven, Mich.
Foamrubber mattresses	Hewitt Rubber Corp., Buffalo, N. Y. United States Rubber Co., New York
Carpet	Mohawk Carpet Mills, Inc., Amsterdam, N. Y.
Flexwood veneers (lounge cars)	United States Plywood Corp., New York
Partitions	Haskelite Mfg. Corp., Chicago
Window curtain fabric	Pantasote Co., New York
Venetian blinds, lounge car	Ajax-Consolidated Co., Chicago
Window curtain fixtures	Adams & Westlake Co., Elkhart, Ind.
Fluorescent lighting fixtures	Luminator, Inc., Chicago
Radio in lounge rooms	Dormitzer Corp., Boston, Mass.
Dictaphone	Dictaphone Sales Corp., New York
Hardware:	Adams & Westlake Co., Elkhart, Ind. Dayton Mfg. Co., Dayton, Ohio H. S. Getty & Co., Philadelphia, Pa. Yale & Towne Mfg. Co., Stamford, Conn.
End door opener and closer	National Pneumatic Co., Rahway, N. J.
Magic door controls for full-length diner	Stanley Works, New Britain, Conn.
Annunciators, call bell and chime (in sleepers)	Edwards & Co., Norwalk, Conn.
Sound-powered telephone receivers	United States Instrument Corp., Summit, N. J.
Inter-car telephone	McKee Electric Co., New York
Hoppers in general toilets	Dayton Mfg. Co., Dayton, Ohio
Toilet facilities, sleeping rooms, toilet seats	C. F. Church Mfg. Co., Holyoke, Mass.
Washstands in general toilets	Crane Co., Chicago
Paper holders	Geo. T. Johnson
Water coolers	E. A. Lundy Co., New York
Prism glass in toilets	Pressed Prism Plate Glass Co., Morgantown, W. Va.
Exhaust fans in toilets	Diehl Mfg. Co., Somerville, N. J. Safety Car Heating & Lighting Co., New York
Paint:	
Exterior	E. I. du Pont de Nemours & Co., Wilmington, Del.
Interior	Glidden Co., Cleveland, Ohio Pratt & Lambert, Inc., Buffalo, N. Y. Sherwin-Williams Co., Cleveland, Ohio
Electric marker lights	Lovell-Dressel Co., Arlington, N. J.
Fire extinguishers (kitchen)	Walter Kidde & Co., Belleville, N. J. American-La France-Foamite Corp., Elmira, N. Y.

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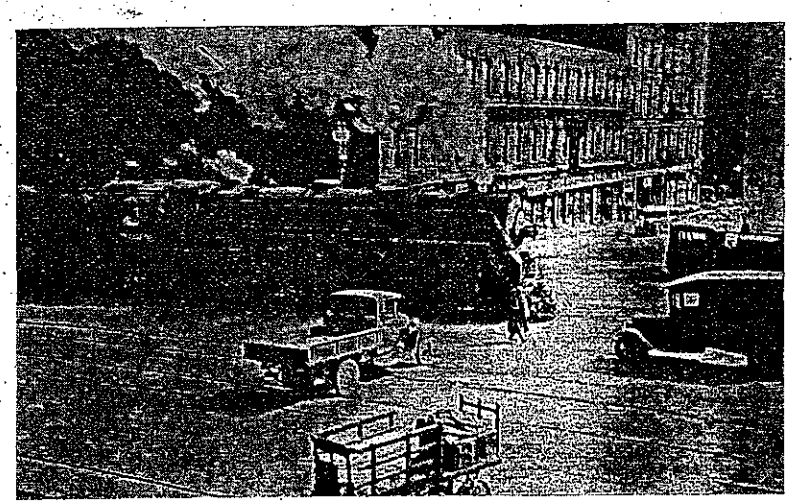
1934

Thirty-Five Main-Line Grade Crossings in New York

Work under contract involvi[ng] 25 bridges, will remove import[ant]



The Empire State Express at Washington and Franklin Sts.

THE elimination of all main-line grade crossings of the New York Central within the city of Syracuse, N. Y., contract for which was awarded on December 8, 1933, will constitute one of the major projects of this character to be carried forward during 1934. In this project, the whole complexion of the New York Central, its lessee line the West Shore Railroad, and a number of its branches within the city will be changed. All main-line tracks will be removed from city streets; all main-line grade crossings will be eliminated; and such tracks as are permitted to remain in streets will be utilized solely for local freight service and for industrial switching, which will involve little or no inconvenience or hazard to vehicular traffic.

The key to the plan is the abandonment of the present double-track passenger main line of the road through East Washington street, a main business street of the city, and the consolidation of this line with the double-track main line of the West Shore Railroad into a three-track line which will be elevated through the city over a distance of approximately 4.3 miles. Of the three elevated tracks, the northerly one will be a West Shore track while the two southerly ones will be New York Central tracks. This work will involve approximately 2,000,000 cu. yd. of embankment and the construction of 25 bridges, and calls for the construction of a new central passenger station which must be completed simultaneously with the opening of the new elevated line and the abandoning of the present passenger station. That part of the project already under contract does not include the new passenger station and the trackwork and signal installations.

Central Has Many Grade Crossings

To appreciate fully the importance of the New York Central project in Syracuse, which has a population of about 210,000, and to understand clearly even the major details of the work, it is necessary to have a general picture of the railroad's long-established facilities in that city. These include principally the two-track passenger main line of the New York Central proper; the double-purely industrial branches, in addition to several yard[s] and a large number of sidings and team tracks.

The present main line of the Central enters the city from the east on its own right-of-way and passes [in a] general westerly direction through the main busines[s] section as a double-track line, occupying East Washing[ton] ton street longitudinally for a distance of approximately 1.4 miles. This line carries all through passenger traffic into and out of Syracuse, as well as local passenger traffic of the main line and of the Chenango and Auburn branches, and a number of express, mail and local freight trains. The total number of trains moving over the line daily averages approximately 100. In their approach to and location in East Washington street, the main line tracks cross 17 north and south streets at grade, a number of these being important thoroughfares.

The present passenger station is located at South Franklin street, at the west end of the occupation of Washington street. This building, which was constructed in 1895, is a stone-faced structure served by a large train shed. West of the station, the main line with supporting coach and freight yards, occupies a private right-of-way to the west city limits, but within this territory it crosses three additional streets at grade.

West Shore and Branches Have Many Crossings Also

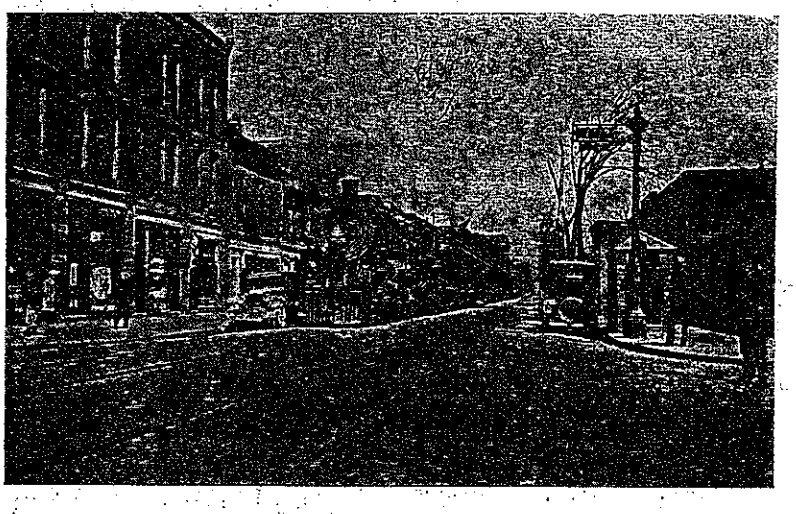
The West Shore main line practically parallels that of the Central about four blocks to the north, but occupies its own private right-of-way. This line crosses 23 streets at grade within a distance of about 2¾ miles. Its most important grade crossings within the heart of the city are at North State, James and North Salina streets, the latter two of which carry street-car traffic.

The Syracuse Junction branch, which is the New York Central's through freight line around Syracuse, passes to the north of the city, extending from the DeWitt classification yard at East Syracuse, to the main line at Syracuse Junction at the west end of the city, a distance of approximately eight miles. This branch, which also handles considerable local freight business, passes through an industrial section which is rap[idly]

ings to Be Eliminated in City of Syracuse

ork Central Project

nvolving 1,000,000 cu. yd. of grading and nportant railway traffic from busy streets



Passenger Trains Operate in Washington St. for 1.4 mi.

Clinton street for a considerable distance and then enters North Franklin street, through which it continues to the present passenger station of the main line. Altogether, this branch occupies about 1.1 miles of city streets, within which distance it crosses a number of other streets at grade. This line also crosses the Syracuse Junction branch at grade at Salina Junction, and the main line of the West Shore at grade in North Franklin street.

The Chenango branch enters the city from the east on the south side of the New York Central main line, and then crosses to the north of the main line about 1,000 ft. east of the point where the main line enters East Washington street. Beyond this point it extends westerly through Canal street, just south of and parallel with the main line of the West Shore, for a distance of approximately one mile. This part of the line is used solely for the handling of local freight, since the passenger service of the branch within the city is handled over other trackage into the present passenger station.

The Auburn branch enters Syracuse from the west and joins the main line at Syracuse Junction. East of this point its traffic moves over either the main passenger line or the Syracuse Junction branch, so that the Auburn branch in itself does not affect the present grade crossing problem.

Other Industrial Branches and Yards

There are three other branches of some importance in Syracuse, called the First Ward branch, the old Auburn branch, and the Tracy Street branch. Only the first of these, however, the First Ward branch, is involved in the present project. This branch leaves the main line of the West Shore near Pearl street and extends in a general northerly direction for a distance of approximately 2½ miles, occupying streets longitudinally for most of this distance. It crosses a considerable number of streets at grade but is not particularly objectionable since it is used only for freight service to local industries.

The three principal yards within the city are the coach yard serving the passenger station, which lies immediately west of the station between South West street and South Geddes street; a large local freight yard of the Central, known as the West Street yard, which lies alongside the passenger coach yard and the Elm Street freight yard of the West Shore, which is located immediately north of Canal street, between Elm and McBride streets. Both of the freight yards are used mainly as assembly and distribution points for local freight.

Outline of the Changes to be Made

In the changes which are to be made at Syracuse, all New York Central traffic now operating through Washington street will be diverted to the new elevated line through two connections; one located between Midler avenue and Peat street, in the eastern part of the city, and the other west of Hiawatha street on the west side of the city. The new three-track line will be carried on embankments between streets, with structural steel bridges over the streets.

When the high-level line is completed, the present main tracks in Washington street from Irving avenue to Franklin street, a distance of approximately 4,800 ft., will be abandoned. The tracks east of Irving avenue will remain in service, but will be used only for serving local industries. Likewise, when the new elevated main tracks are put in service, through traffic over the Watertown branch will be discontinued via North Clinton and North Franklin streets, and the present track of this branch in Franklin street, from Laurel street to the present passenger station, will be abandoned. The remaining trackage of the branch within the city will be maintained as located, but will be used solely for local freight and industrial service. The passenger trains of the branch, which now proceed down Franklin street to the present Central station, will operate over the Syracuse Junction branch from Salina Junction to Syracuse Junction, and thence over the elevated main line tracks into the New York Central passenger station. Freight traffic from the Watertown branch will move over the Syracuse Junction branch easterly to DeWitt yard, or westerly to Belle Isle yard, west of the city.

Changes in the Chenango branch include principally the construction of a new connection with the main line of the West Shore just east of the city limits. This new connection, which has already been built, will permit Chenango branch passenger trains to move directly over one of the elevated main tracks to the new pas-

city, east of Crouse avenue and west of Catherine street, will remain for local industrial service only.

The connection of the First Ward branch through Pearl street to the West Shore will be removed and a new connection, now under construction, will be provided from a point near the north end of the branch, to the Syracuse Junction branch.

The West Street yard will be altered considerably but will remain an important yard for team track and freight house service, and for serving industries. In fact, a considerable number of alterations have already been made in this yard to provide team tracks to replace the present team tracks at Pearl street and vicinity. A new team yard is planned near Peat street to replace Chenango branch team track facilities in the vicinity of Howard street. This yard will include six tracks, with capacity for 85 cars. A small freight yard will also be constructed near Peat street, and, in fact, this yard, which will include nine tracks with an ultimate capacity for 200 cars, is now under construction.

Details of Crossing Changes to be Made

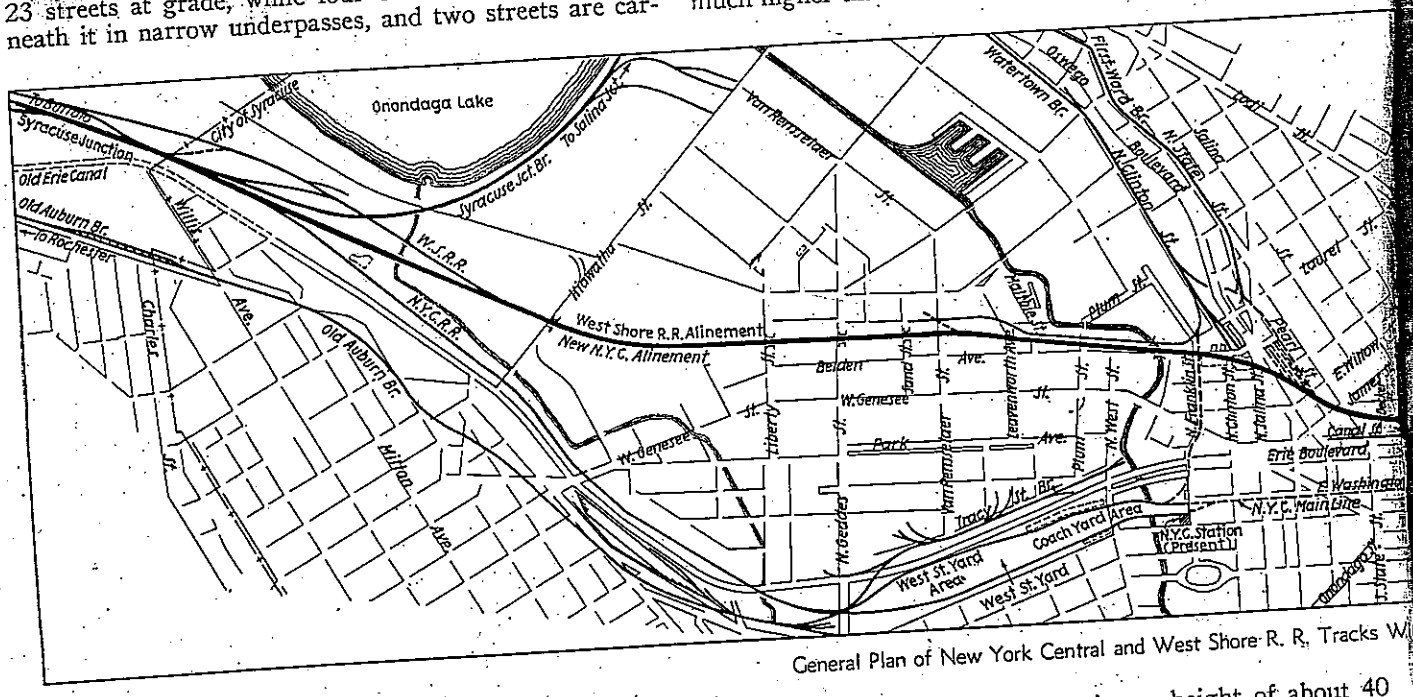
In passing through Syracuse, the West Shore crosses 23 streets at grade, while four other streets extend beneath it in narrow underpasses, and two streets are carried overhead on long viaducts built a couple of years ago preliminary to the general grade crossing elimination project. From east to west, the streets involved, in one way or another, are, in order, as follows: Thompson road, Midler and Nichols avenues, Peat street, Greenway and Teall avenues, Beech, Elm and Lodi streets, North Crouse avenue, Catherine, North McBride, North Townsend, Decker, North State, James, Pearl and East Willow streets, Oswego boulevard, North Salina and North Clinton streets, Belden avenue, North Franklin, Plum and Maltbie streets, Leavenworth avenue, and Van Rensselaer, Sand, North Geddes, Liberty and Hiawatha streets.

Thompson road formerly crossed beneath the West Shore about 300 ft. east of the present two-level crossing of the West Shore and the New York Central main lines in the eastern part of the city, and while it involved [illegible] main line at grade, it

the New York Central connection from DeWitt yard to the West Shore railroad. In 1930 this highway was shifted to the west and carried directly over the two-level main line railroad crossing on a steel girder structure with long viaduct approaches. The structure built in effecting this elimination is approximately 1,650 ft. long, and, directly over the intersecting railroad lines, is approximately 50 ft. above the New York Central tracks.

The four streets which already pass beneath the West Shore are Sand, North Geddes, Liberty and Hiawatha streets, all of which are on the west side of the city. These streets will be provided with new railroad bridges of greater span at the time the other new street bridges are constructed. The only highway bridge yet to be built in the project will carry Midler avenue over the present main line tracks of the Central, just east of where they will cross over their new elevated route.

Through the main body of the track rise the new tracks will, in general, be from 20 to 22 ft. above the present track level, but will reach a maximum height of 27 ft. in the vicinity of Plum street. Owing to the fact that most of the present tracks in the west half of the city are already on a fill, the new three-track fill will be much higher than the difference in track elevations would indicate, and will reach a maximum height of about 40 ft. above the general ground level in the vicinity of Liberty street.



General Plan of New York Central and West Shore R. R. Tracks W

The rise in the track grade at the east end of the work will begin at practically the east end of the new connection between the Central and the West Shore tracks. The initial rise will be on a 0.3 per cent grade, which will extend to the present West Shore right-of-way, a distance of about 3,700 ft. At this point, the elevated main tracks will be approximately 12 ft. above the level of the present tracks. Immediately west of this point the tracks will be on a level grade for about 1,600 ft., beyond which, for about 3,000 ft., they will drop on a 0.10 per cent grade to the west and then continue on a level grade for a distance of about 2,600 ft. Within this latter stretch of level track the new station facilities will be provided. West of the station tracks, the main tracks will rise on a 0.15 per cent grade to the west for [illegible] of about 1,500 ft., and will then drop off on

level of the existing New York Central main Syracuse junction.

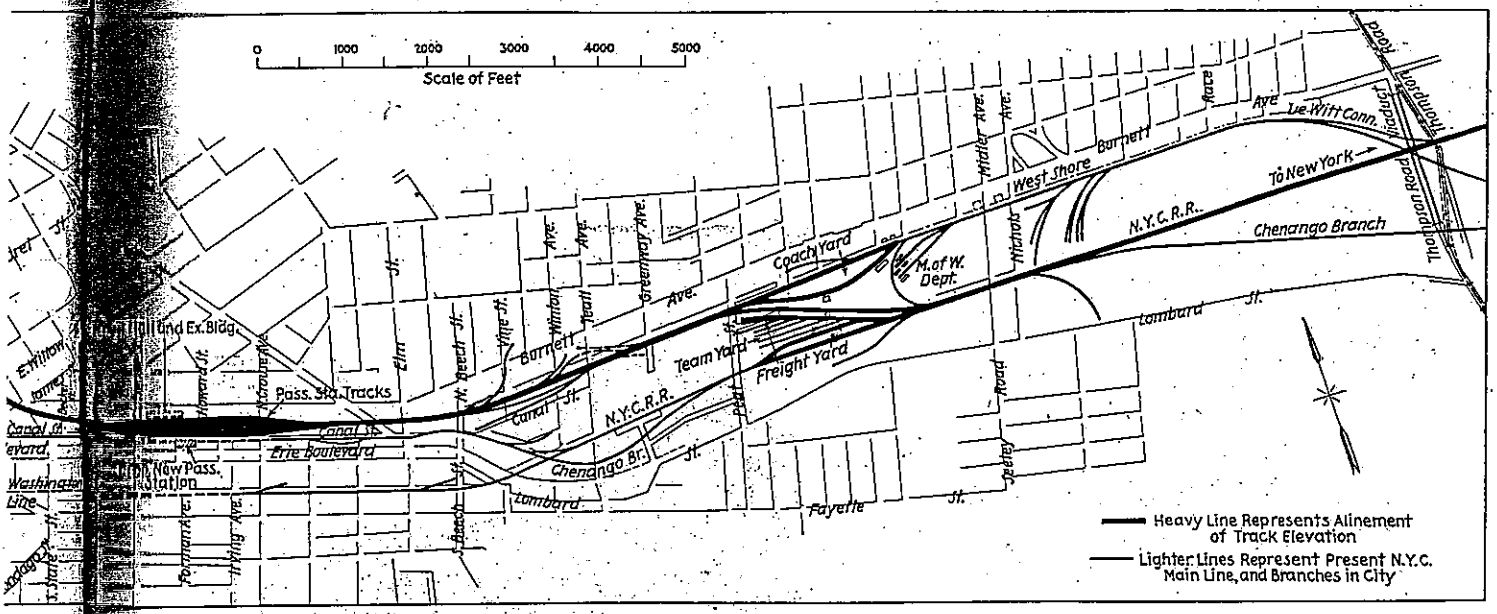
Throughout, the elevated tracks will be supported on embankment between streets, with natural side except at certain points where restricted width of right-of-way will make the construction of retaining walls necessary.

Three Types of Steel Bridges

The bridges to carry the tracks over the streets will be of three general types, the longitudinal I-beam type, the deck plate girder type, both with facia girders, and the through girder type with transverse floor beams. About half of the bridges will consist of single spans between abutments, while the other half will employ center columns, although in one case curb columns will be used alone, and in another case, both curb columns and center columns will be employed. In all cases the bridges will have either concrete deck slabs or steel deck floors, with asphalt blocks directly above a waterproofing course in both cases to prevent damage by the track ballast.

The longest railroad bridges to be built will be those across James, State, Lodi, Salina and Geddes streets, and Oswego boulevard and Willow avenue. These bridges will carry three tracks and involve rather long girders, and, except at Geddes street will be on severe skews. The largest bridges, from the standpoint of the number of tracks, will be those over North Crouse avenue and Catherine street, at opposite ends of the new passenger station layout, both of which will carry 12 tracks and one or more turnouts. Both of these structures will be of the I-beam, plate-deck type with center columns, and each will provide a street opening of 66 ft.

In addition to the bridges over streets, a three-track main-line bridge and a single-track branch-line bridge will be necessary over Onondaga creek, which passes beneath the West Shore between North West and North Franklin streets. Mass-type concrete abutments, in most cases supported on piles, will be used at all of the bridges.



acks W[illegible]racuse, N. Y.—Heavy Line Shows Alinement of Track Elevation

Passenger Station Track Layout

While details of the new passenger station have not been decided upon as yet, it is planned to locate the station on the south side of the tracks, between Catherine street and North Crouse avenue, in a section of Canal street, which will be closed between these streets. In this location the station will front on Erie boulevard, a paved street 80 ft. wide, constructed over the old Erie canal bed. In practically all respects the new station will be more favorably located than the present station, and especially from the standpoint of accessibility from all sections of the city.

The track layout at the station will include 10 through station tracks in pairs, with five platforms. Four of the platforms will be of the island type, between pairs of tracks, while the fifth will be a one-side platform along the most northerly track. An additional stub track north of the passenger tracks will be used exclusively by mail and express cars in serving a mail and express building to be built on that side of the station layout. A couple of short double-end sidings toward each end of the station layout will serve the main through tracks to afford the greatest flexibility in the setting in or out of Pullmans, diners or other special equipment. There will also be two short stub tracks at each end of station layout.

The main passenger platforms, which will also be used for handling baggage to and from trains, will be 22 ft. wide, 1450 ft. or more in length, and will be provided with canopies. Access to and exit from each platform will be by two sets of stairs leading down to opposite sides of a passenger subway which will extend directly into the new station. A baggage subway will also be provided at right angles beneath the tracks and will be served by baggage elevators at each platform.

The station track layout, which will be approximately 20 ft. above the surrounding city streets, will be supported entirely on earth fill, except for the street bridges at each end. On the south side, facing Erie boulevard, the embankment will be sustained by concrete retaining walls east and west of the station building, while on the north side, the embankment will be given a normal slope to the natural ground level.

While carrying out the track elevation work, the West Shore main tracks will be abandoned and all West Shore trains which use that main line at the present time will be operated over the present passenger mains of the New York Central or over one of the branch lines reaching other sections of the city. Watertown branch pas-

senger trains will continue to come into the present Central station over the present route in Clinton and Franklin streets until a new interlocking plant at Syracuse Junction is completed and put in service. Then, instead of proceeding through North Clinton and North Franklin streets, they will move from Salina Junction to Syracuse Junction, and thence over the present New York Central main line to the station.

In addition to approximately 2,000,000 cu. yd. of grading, it is expected that the work now under contract will involve the use of approximately 186,000 barrels of cement and the erection of 12,600 tons of structural steel.

The work at Syracuse has been planned by the engineering department of the New York Central and is being carried out under the general direction of J. W. Pfau, chief engineer, and E. A. Dougherty, designing engineer. All bridge design was under the immediate direction of H. T. Welty, engineer of structures. The field force of the New York Central, already at Syracuse, is under the direction of A. D. Duffie, assistant engineer.

Contract for all of the grading, masonry and bridge work in the project as outlined, has been awarded to the Walsh Construction Company, Davenport, Iowa, which has sub-let the steelwork to the American Bridge Company.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended April 7 totaled 557,887 cars, a decrease of 50,556 cars as compared with the preceding week but an increase of 65,826 cars as compared with the corresponding week of last year and of 12,264 cars as compared with 1932. The principal decrease as compared with the week before was in coal loading, which declined 49,618 cars. Miscellaneous freight, merchandise, and ore showed increases. As compared with last year, merchandise, grain, and live stock showed decreases. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading
Week Ended Saturday, April 7, 1934

Districts	1934	1933	1932
Eastern	131,027	110,547	130,622
Allegheny	110,172	89,566	111,116
Pocahontas	37,608	32,636	32,434
Southern	90,180	81,483	84,534
Northwestern	64,558	55,960	61,371
Central Western	78,651	75,904	80,265
Southwestern	45,691	45,965	45,281
Total Western Districts	188,900	177,829	186,917
Total All Roads	557,887	492,061	545,623
Commodities			
Grain and Grain Products	25,917	33,212	29,056
Live Stock	13,041	15,343	17,211
Coal	88,940	82,482	88,188
Coke	5,937	3,484	4,059
Forest Products	23,550	16,784	19,595
Ore	5,089	1,788	2,673
Merchandise L.C.L.	167,040	160,895	187,906
Miscellaneous	228,373	178,073	196,935
April 7	557,887	492,061	545,623
March 31	608,443	498,356	544,961
March 24	608,462	479,959	561,118
March 17	625,773	453,637	584,759
March 10	612,402	441,361	575,481
Cumulative Total, 14 Weeks	8,103,535	6,741,356	7,881,413

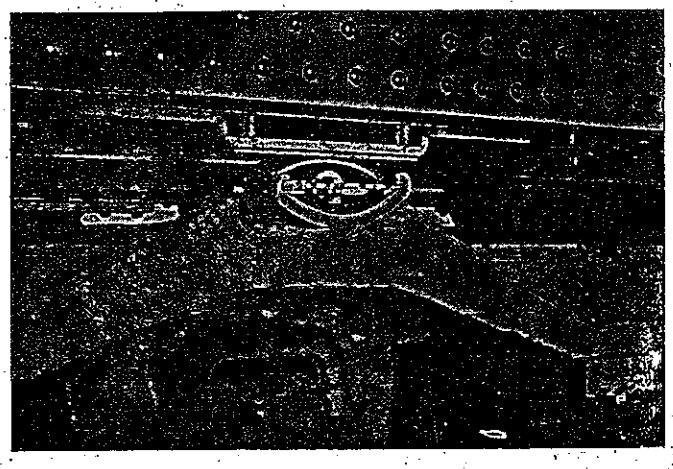
Car Loading in Canada

Car loadings in Canada for the week ended April 7 ings, according to the compilation of the Dominion Bureau of Statistics. After adjusting for the holiday in the previous week the index number showed a decline from 71.67 to 71.13, due to light loading in the western division.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
April 7, 1934	40,711	25,828
March 31, 1934	38,512	25,061
March 24, 1934	42,313	25,050
April 8, 1933	32,370	17,858
Cumulative Totals for Canada:		
April 7, 1934	570,502	324,380
April 8, 1933	463,169	239,734
April 9, 1932	576,765	303,610

A Shock-Absorbing Side Bearing

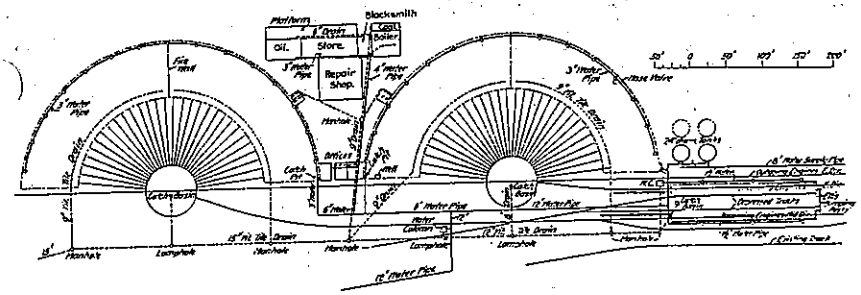
A SIDE bearing for passenger-train cars, developed and tested during the past two years by the Railway Products Company, 5949 Superior street, Chicago, is designed to include a shock-absorbing feature in its construction, as well as to provide a gradually increasing resistance to car roll under all conditions. It also promotes ease of truck swiveling, elimination of noise, and freedom from maintenance difficulties. The initial application of this side bearing was made to a steel dining car of the Chicago & North Western, on which it is reported to have given satisfactory service for a period of over 18 months, with frictional wear



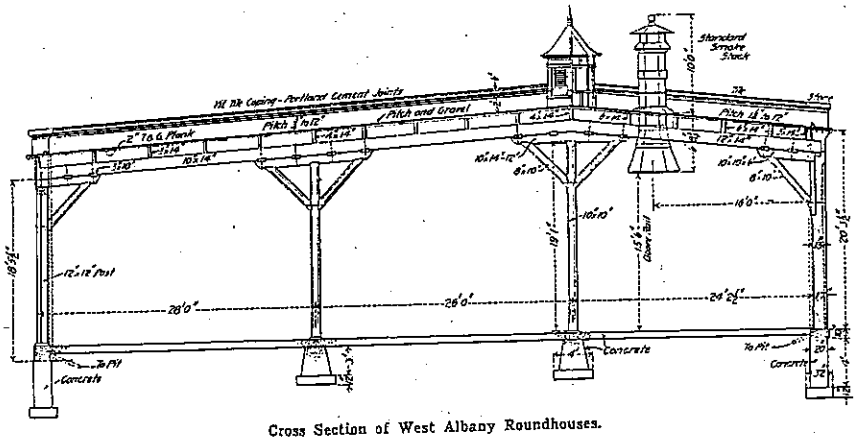
Application of RPCO (Drews) Shock-Absorbing Side Bearing on a Steel Dining Car of the Chicago & North Western

negligible and no adjustments, repairs, or replacements required.

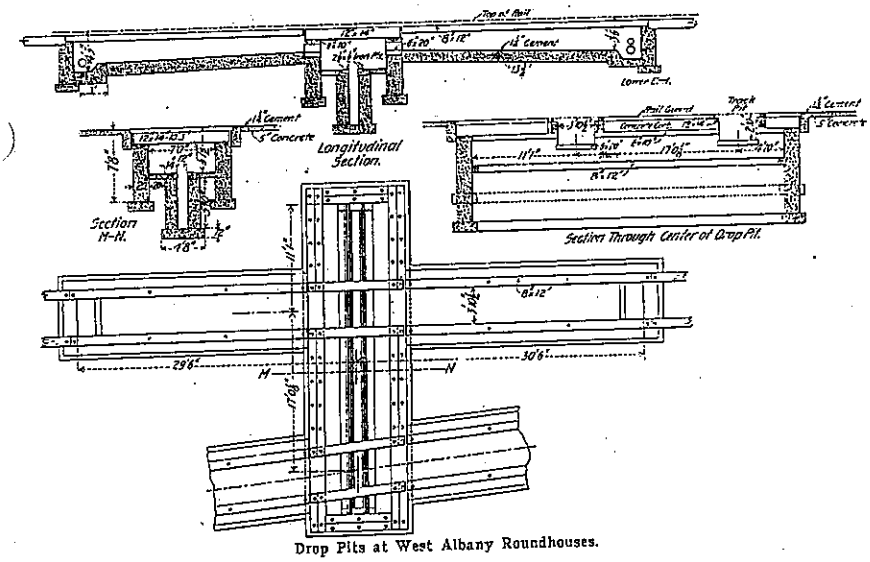
This side bearing, which is called the RPCO (Drews) type, can be applied without any change in the construction of car body or truck. It is simply bolted to the side bearing arch of the truck with two ½-in. bolts through an adapter plate which replaces the friction plate usually provided. The RPCO bearing, itself, comprises essentially a cast-steel base plate, which is capable of sliding movement at one end in a saddle casting to provide the small extension in length required when the supporting springs are compressed. These springs include an arched spring plate which bears against the car body side bearing and two truss springs located on on either side of the truck side bearing. In operation



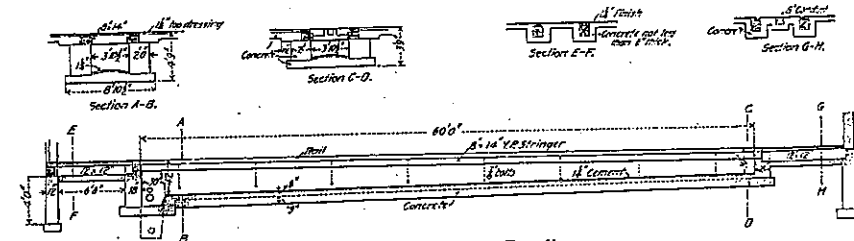
West Albany Roundhouses.



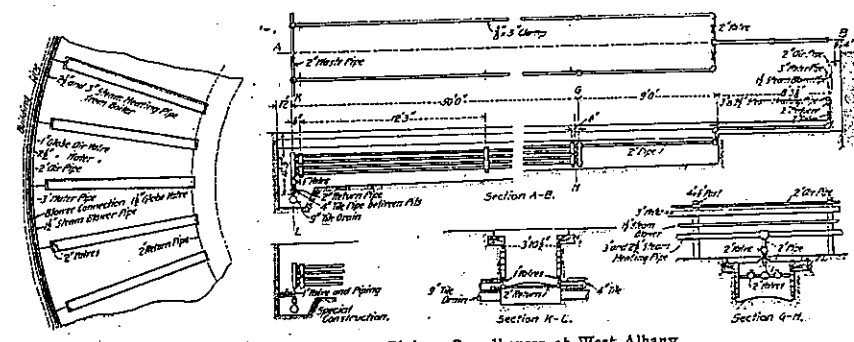
Cross Section of West Albany Roundhouses.



Drop Pits at West Albany Roundhouses.



Sections of Pit—West Albany Roundhouses.



Arrangement of Steam Piping—Roundhouses at West Albany.

New York Central Improvements at West Albany.

General plans and detail designs are made for new yards, roundhouses and accessories, a coal stocking plant and a coal trestle on the New York Central & Hudson River Railroad at West Albany. The illustrations give a general idea of the scope of the work and show details. The contract for roundhouses has been given to Mr. W. J. Gillett, Syracuse, N. Y., and it is intended that the buildings shall be complete by midsummer. The yard work will begin soon and will be carried far toward completion next summer.

The main body of the yards will have 21 tracks; the coal storage yard 21 tracks; the lower part of the yard, to be used for transfer work, will have 13 tracks, and there will be separate tracks for inbound and for outbound engines of the Eastern Division, for inbound engines of the Middle Division, and a track to the stores and shops skirting the roundhouses, as shown in the general plan of the yards.

Two tracks having a double cross-over are also shown leading into the circle of the coal stocking plant. This coal plant will be like the Dewitt plant, described and illustrated in the *Railroad Gazette* of March 8, and will take care of approximately 50,000 tons of run-of-mine soft coal, the calculation being to store 25,000 tons at either side of the two entry tracks. The coal storage yard near by will hold about 400 cars.

The coaling trestle will be double-track and will have 25 double coal pockets delivering from both sides of the structure, thus giving service equivalent to that of 50 single pockets. These pockets and the double sand pockets, of which there are two shown in detail, and the general plan and elevation of the coaling station are given with sectional views of the structure.

The present roundhouse is near the locomotive shops and has 38 available stalls. The turntable is light and the house not suitable for modern engines. Tender work and light repairs on the older locomotives will be done there until the house is finally taken down. The old engine house shown near the transfer yard is a frame building used for storing engines.

All passenger engines are housed at Rensselaer, in a 45-stall roundhouse of the Boston & Albany, and the two new houses will be for freight engines. The Boston & Albany freight engines, and also those of the Hudson Division of the New York Central, will be housed in the Eastern Division house and other freight engines will be cared for in the house marked "Middle Division." About 200 engines will be handled daily. Each house will have 30 stalls and a 70-ft. turntable that will be operated by a gasoline engine or an electric motor.

The plan of roundhouses (giving particular attention to the piping) shows the relative position of offices, repair shops, storehouse and boiler room. Careful consideration has been given to heating, lighting and sanitation. Eventually, the lighting will probably be from an electric power plant which is to be built near the West Albany shops and will cost approximately $90,000. The shops are also to be remodelled and the new electric plant will furnish light and power for the shops and yards. The plant will have approximately 1,500 h.p. at first, with provision made for 500 h.p. additional. The new shop plans are now under way and it is intended to complete the work within the year.

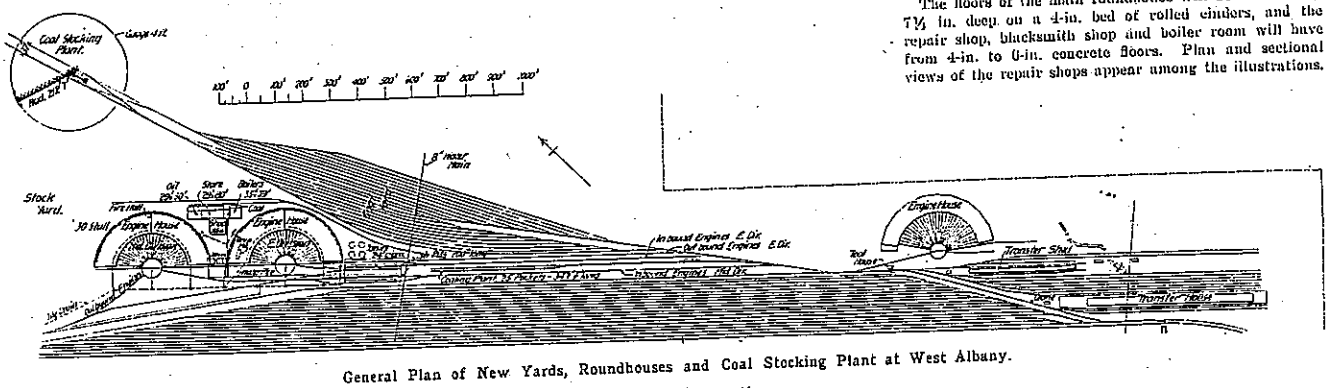
The roundhouses will be New York Central standard, modified in minor details to suit local conditions. The main foundations will be Portland cement concrete, 1:3:6 and 7½. The parapet or outer walls of the houses will be brick, with stone coping at the ends of the parapet walls and vitrified tile coping on the intermediate portions; all coping to be set in Portland cement, 1 and 1. The inner or door circle will be wood. A cross-sectional

N. Y. C. & H. R. R. Standard Cement Tests.

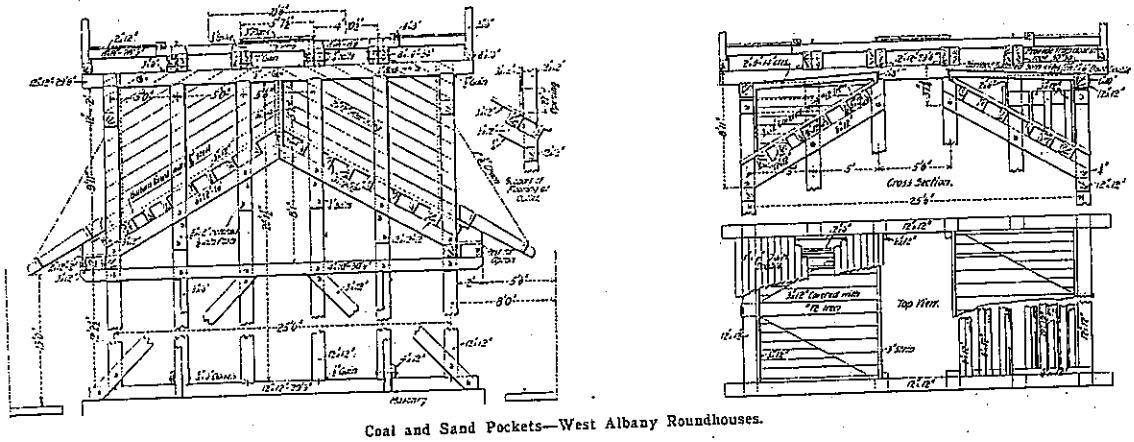
TESTS.	NATURAL ROCK.	PORTLAND.
Sieve No. 50 of 2,500 meshes per sq. in. of No. 35 Stubb's wire gage	95% "fine."	97% "fine."
No. 100 of 10,000 meshes per sq. in.	80% "fine."	90% "fine."
Light Wire Cement to bear ⅛ in. diameter wire, weight 1 oz. without imprint, in not less than	25 minutes.	25 minutes.
Heavy Wire Cement to bear ¼ in. diameter wire, weight 1 lb. without imprint, in not less than	50 minutes.	50 minutes.
Checking, Cracking and Hot Tests.—Flat cakes or "pats" of stiff plastic neat cement paste, two to three in. diameter by half in. thickness, with thin edges, to be immersed in water not less than two days.	Must not crack nor become contorted along the edges.	Shall withstand, without cracking, a temperature of steam or water of 212 deg. F. after 24 hours set in cold water.
Tensile Strength.—Standard Briquettes of one sq. in. of breaking sections. Stress applied at a uniform rate, from zero, of about 400 lbs. per one minute.		
Neat—		
1 hour in air, 23 hours in water	65 lbs.	125 lbs.
24 hours in air, 6 days in water	120 lbs.	350 lbs.
24 hours in air, 13 days in water	150 lbs.	468 lbs.
24 hours in air, 20 days in water	175 lbs.	486 lbs.
24 hours in air, 27 days in water	185 lbs.	525 lbs.
Average	139 lbs.	375 lbs.
Standard Sand—	1 to 2.	1 to 3.
1 hour in air, 23 hours in water	30 lbs.	60 lbs.
24 hours in air, 6 days in water	50 lbs.	125 lbs.
24 hours in air, 13 days in water	75 lbs.	160 lbs.
24 hours in air, 20 days in water	90 lbs.	180 lbs.
24 hours in air, 27 days in water	100 lbs.	200 lbs.
Average	69 lbs.	145 lbs.
Weight— One barrel shall contain of neat cement, not less than	Natural Rock, 300 lbs.	Portland, 380 lbs.

view shows the timbering and other details. The water-table and pier caps will be concrete, of the same composition as that of the main foundations. The walls of the turntable pit, engine pits and boiler foundations will be concrete, 1:4 and 7½, faced with Portland cement dressing not less than 1 in. thick and in the proportion of 1 to 1½, cement and sand. This facing will be used on all concrete that is exposed to the weather. The concrete center piers of the turntables will be made of a 1:3 and 6 mass. A table showing New York Central standard cement tests is given.

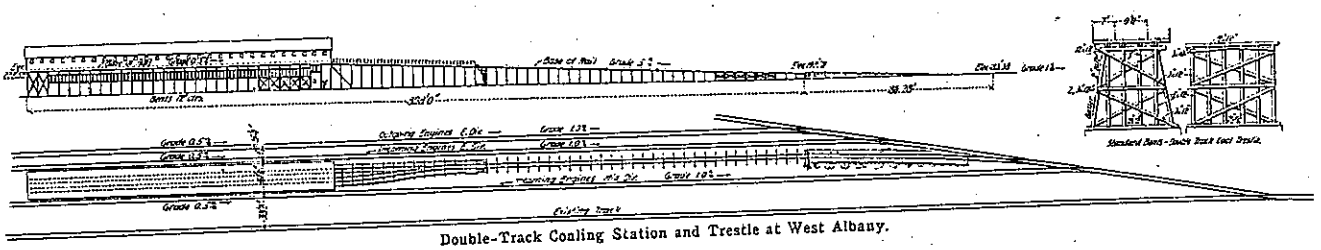
The floors of the main roundhouse will be of concrete, 7½ in. deep on a 4-in. bed of rolled cinders, and the repair shop, blacksmith shop and boiler room will have from 4-in. to 6-in. concrete floors. Plan and sectional views of the repair shops appear among the illustrations.



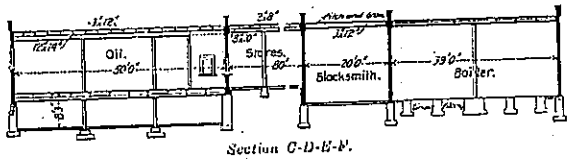
General Plan of New Yards, Roundhouses and Coal Stocking Plant at West Albany.



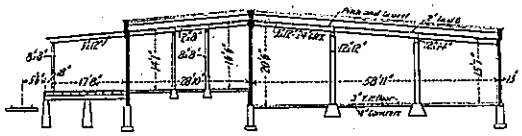
Coal and Sand Pockets—West Albany Roundhouses.



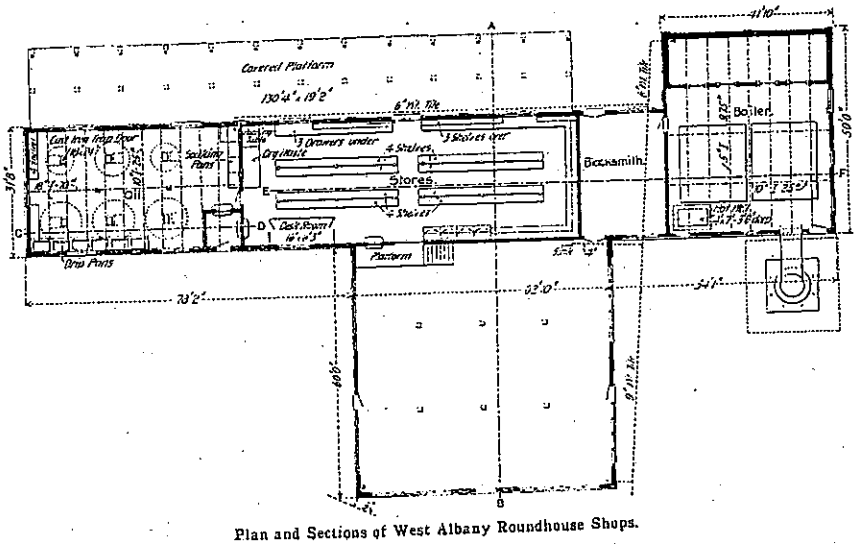
Double-Track Coaling Station and Trestle at West Albany.



Section C-D-E-F.



Section A-B.



Plan and Sections of West Albany Roundhouse Shops.

The concrete work of the engine pits and drop pits is fully illustrated. Steam heat will be used, all pipes being in the pits, except the steam mains. Details of this work are shown in the illustration of steam piping arrangements. There will be pneumatic jacks in the drop pits, the provision for which is illustrated in the sectional views of drop pits.

The boiler plant, which will supply steam only for the repair shop work and for heating will have four 125-h.p. water tube boilers in batteries of two boilers each. There will be a self-supporting unlined steel stack 135 ft. high above the cast-iron base plate, the greatest inside diam. to be 9 ft. at the flare of the base. The foundation will have six courses of concrete, the bottom course to be 22 ft. 6 in. square, the top course 12 ft. 6 in. square, and the total depth of base 12 ft. 6 in. The top course will be concrete in the proportion of 1:3 and 6, all other courses to be 1:4 and 7½. A 1-in. x 1-in. copper rod attached to the base plate and grounding in old rails buried a safe distance from the base will be used to conduct lightning to earth. Beginning with the base course of the stack there is first 30 ft. of ½ in. steel; 10 ft. 7-16 in.; 20 ft. ⅜ in.; 20 ft. 5-16 in.; 20 ft. ¼ in.; 20 ft. 3-16 in.; and a top course of 15 ft. is made up of 3-16 in. steel with a No. 19 B. & S. gage sheet copper cap.

We are indebted to Mr. W. J. Wilgus, Chief Engineer, and his assistants, Mr. E. B. Kattè and Mr. W. F. Jordan, for the drawings and information from which this description is given.

Dec 7 1900

Chesapeake & Ohio, that the law was an interference with interstate commerce, is answered by the dictum that the road need not consider the law in carrying interstate passengers. The report of the decision will be found in another column. This must be accepted as good law, and probably it is such; but it is poor justice. The Kentucky statute is presumed by the courts to contemplate the use of separate cars for interstate passengers; and with public sentiment as it is in the Southern States, this legislative requirement, increasing the expense of running passenger trains, is, no doubt, looked upon as fair and just. But if a railroad tries to carry both interstate and intra-state on the same train (where, usually, one car is enough to hold all of the passengers who do not smoke) which shall change cars at the state line, the whites or the blacks? Assume that it shall be the blacks, they usually being in the minority. Then when a train comes into Kentucky from West Virginia the negroes will be invited to take seats in another car. But these passengers can decline to change, because they are interstate; what then? If they retain their seats their presence will be offensive to the white passengers who board the train in Kentucky, although those white persons in the car who came through from West Virginia must be assumed voluntarily to have accepted the negroes' company. The only course open to the railroad would seem to be to run three cars. At first thought it might seem to be sufficient to run two; but if the interstate negro passengers insist on staying in the white folks' car the white Kentuckians can lawfully object to entering that car. Using three cars where one would carry all the passengers is perhaps as good economy as could be expected from a Legislature. Such a law is a good thing if it is desired to compel the railroads to postpone reductions in fares. And it is to be remembered that the use of partitions, making two compartments in one car, does not wholly meet this objection, for the smaller the space allotted to either race the greater the likelihood of frequent occasions when one compartment will be crowded while the other has room to spare.

NEW PUBLICATIONS.

Master Car and Locomotive Painters' Association.—The *Proceedings* of the 31st annual convention of this Association, held in Detroit last September, are now issued in a bound volume of 148 pages, with index, constitution and list of members. The Secretary is Mr. Robert McKeon, Erie Railroad Company, Kent, Ohio, from whom, no doubt, copies can be had.

TRADE CATALOGUES.

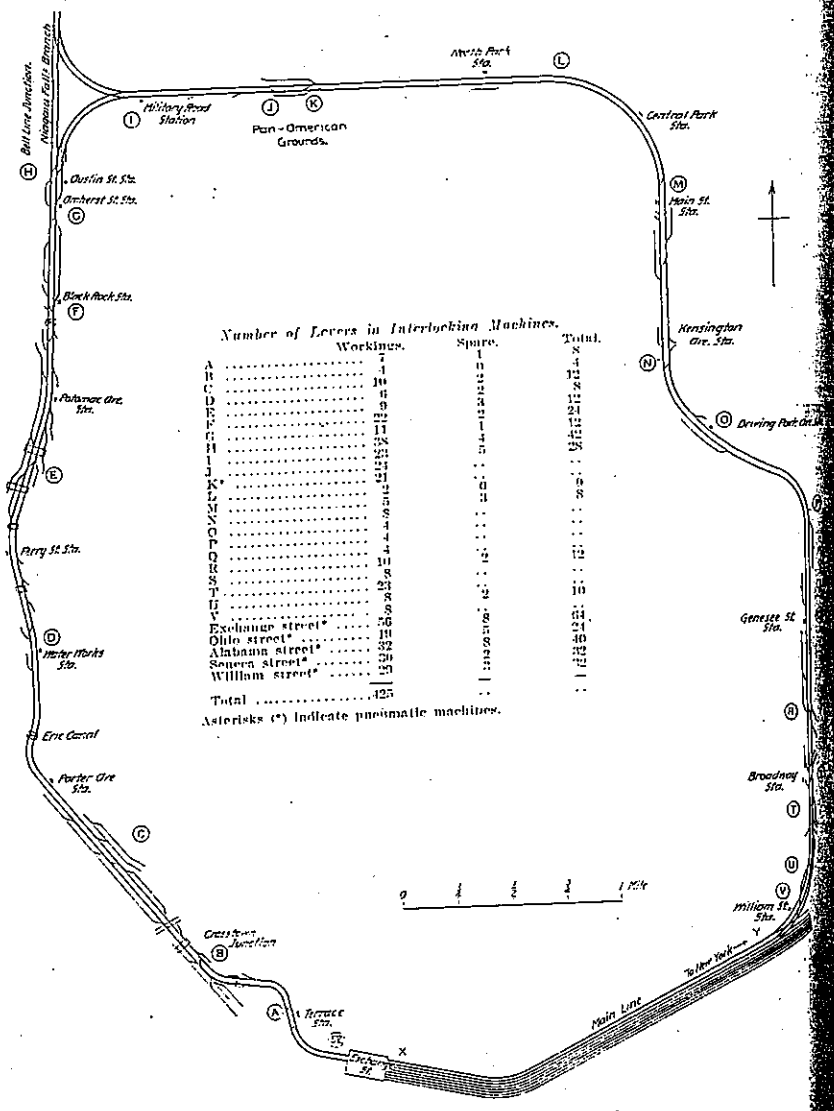
The Sterlingworth Steel Car.—The Sterlingworth Railway Supply Co., Easton, Pa., sends a second and enlarged edition of its car catalogue illustrating the Sterlingworth rolled steel car which attracted so much attention at the convention last June. The company says that since the close of that convention it has received letters from ten roads asking for specifications, prices, etc. The engravings show a gondola, a hopper bottom ore car, a box car and two flat cars.

Automatic Signals: Normally clear vs. Normally danger. This is the title of a pamphlet entitled Bulletin No. 5, which has been issued by the Union Switch & Signal Company, Swissvale, Pa. It contains the arguments, amplified and illustrated with drawings, which have been published heretofore by this company, or by Mr. J. P. Coleman, setting forth the advantages of the "normal-clear" arrangement and the disadvantages of the "normal-danger."

Signaling for the Pan-American Exhibition.

All of this signaling is to be done by the Standard Railroad Signal Company, of Troy, and those machines which are not pneumatic will be of the Standard Company's mechanical pattern, with vertical locking.

This signaling equips the whole of the Belt Line, so called, about 18 miles, which extends around the city of Buffalo. We give herewith a sketch showing on a small scale the approximate location of this line. From the Union Passenger Station (Exchange street) eastward to William street the Belt consists of a part of the main line, and from Exchange street northward to Belt Line Junction it is a part of the Niagara Falls branch. The whole of the line is double track, and local passenger trains make the circuit each way every 30 minutes during the day. For the exhibition traffic the number of these trains will, of course, be indefinitely increased. The location of the various crossovers and sidetrack connections, as shown on our sketch, is subject to some changes, but in a general way it may be said that all of the main [illegible] and signaled.



Number of Levers in Interlocking Machines.

	Workings.	Spare.	Total.
A	7	1	8
B	4		4
C	10	2	12
D	8	2	10
E	13	3	16
F	11	3	14
G	25	5	30
H	25	5	30
I	25	5	30
J	25	5	30
K*	24	6	30
L	25	5	30
M	25	5	30
N	25	5	30
O	25	5	30
P	4		4
Q	12	2	14
R	10	2	12
S	8	2	10
T	12	4	16
U	8	2	10
V	26	4	30
Exchange street*	32	8	40
Ohio street*	32	8	40
Alabama street*	32	8	40
Seneca street*	32	8	40
William street*	32	8	40
Total	425	125	550

Asterisks (*) indicate pneumatic machines.

The Buffalo Belt Line of the New York Central.

for the existing plant at the west end of the station, will serve for these five new ones.

The total number of levers in all these plants is to be [illegible] and 125 pneumatic. The [illegible]

New York Merchants on the Interstate Commerce Law.

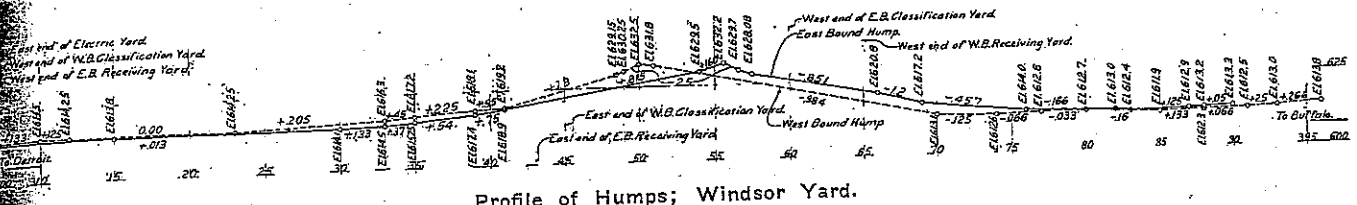
The arguments that have been presented in opposition to the proposed measure (the Cullom bill) as it now stands, have features which are of sufficient merit to indefinitely postpone its enactment and possibly to accomplish its ultimate defeat. The proposed amendment imposes upon the Commission vast responsibilities and duties involving matters of grave importance. The Interstate Commerce Commission should be removed from all suspicion of political influence, so far as that is possible, in its make-up and in its life, so that, in the eyes of the public, it may stand upon a plane similar to that occupied by the Supreme Court of the United States. If it is to make decisions on the intricate and far-reaching questions which are to come before it under the enlarged powers which are proposed in this bill, conservative people would feel far safer if they knew that the Commission was removed from politics and all political influences. I do not mean to imply that the present [illegible] to political influences; but in the very [illegible] missioners shall be increased so as to include [illegible] them. First, men trained in railway freight manage[illegible] and, second, men who are thoroughly familiar with [illegible] affairs, who could act as advisers in [illegible] legal and technical questions which are sure to [illegible] them. The appointment of men to [illegible] with [illegible] conditions existing in this country, there [illegible] among the members of that body those who [illegible] a study of the subject in all its involved [illegible] The principal opposition to giving to the Co[illegible] the enlarged powers proposed in this bill arises [illegible] fear that questions of great import will be pass[illegible] by men not trained to regard the subject fr[illegible] than elementary, purely legal, or political stand[illegible]

Briefly stated, we believe: 1, That the [illegible] Commerce Commission should consist of at le[illegible] members, among whom shall be lawyers, rail[illegible] perts and representatives of the shipping public[illegible] the Commissioners should be appointed to [illegible] during good behavior, as in the case of the [illegible] States Supreme Court; 3, That common carri[illegible] be given the right to enter into agreements, [illegible] by the Commission, in respect to interstate [illegible] only for the purpose of carrying into effect [illegible] visions of the act.

Our reasons for the first two propositions [illegible]

The electric yard begins a short distance east of the station and is entered by a double track lead from the main tracks. It also has connections with inspection and switching tracks alongside the main line. A small inspection shed is provided at this point for minor repairs to the electric locomotives, which must be made on the Windsor side. The electric yard has eight tracks, each about 3,000 ft. long, the leads being arranged so that four of the tracks are operated as eastbound and four westbound. The track centers are 15 ft. between adjacent tracks in each set to two tracks about 1,600 ft. long, and five tracks about 4,000 ft. long. All of these seven tracks converge to a single lead to the main track.

The entrance to the westbound receiving yard is at the same point as the junction of the eastbound classification yard with the main. A single lead to this receiving yard diverges at once to five tracks about 3,600 ft. long. A 20-stall brick and frame engine house, a hemispherical bottom steel water tank, a concrete cinder pit, an oil house and other accessory buildings are provided



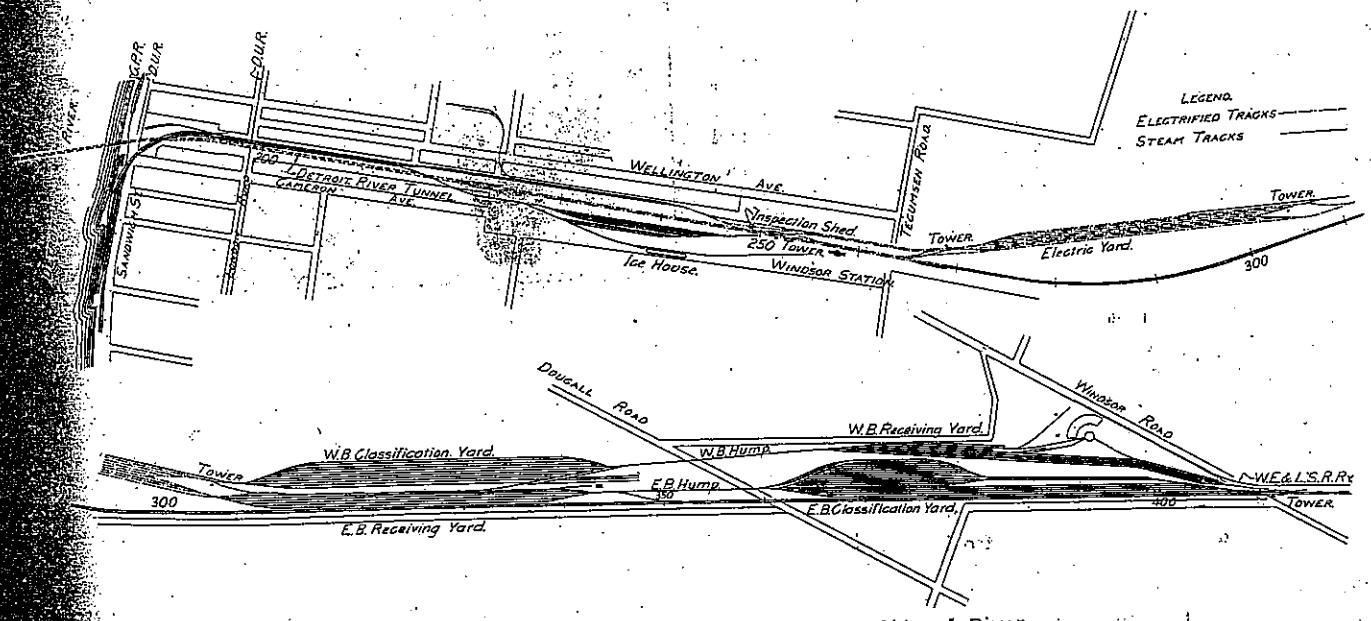
Profile of Humps; Windsor Yard.

at this point, reached by engine leads from this receiving yard. As there were no accommodations for train men within convenient reach of this point the company has provided a house where the men can secure rooms and meals.

The crossings of the two humps and the main line over the highway are carried on plate girder structures raised on concrete abutments. It was necessary to revise the main line grade to provide the necessary clearance over this road. The highway which crossed the side near the east end of the eastbound classification yard was closed and in return for this concession the company built and maintains a highway parallel to its tracks on the north side of the westbound receiving yard to a junction with Dougall road, which crosses under the humps.

The westbound classification yard consists of 12 tracks averaging about 3,100 ft. long, entered from a single ladder off the four, and 19 ft. 6 in. between the two sections, allowing room for a row of electric arc light poles down the center of the yard. The yard is laid with 80-lb. relaid rail on creosoted ties. Manganese frogs are used throughout. This yard serves the same purpose and is operated in the same manner as the one already described on the Detroit side, except that the steam locomotives operating into and out of these yards are the shifting engines from the hump classification yards. An all-electric interlocking plant governs the entrance of the yard at the west end and a mechanical plant governs the connection between the electric and the steam yards.

The eastbound steam receiving yard connects directly with the eastbound electric yard and has six tracks about 3,100 ft. long. A Canadian customs house is provided in connection with the yard for an inspection of cars by the Canadian government.



Classification and Electric Yards on Windsor Side of River.

A connection is provided from the east end of this yard to the main tracks to allow any trains which do not have to be classified to take the main line again without going over the hump. A long lead over the hump was required on account of the location of a public highway which could not be closed and which had to be crossed at an elevation which would provide ample clearance. The grades over both humps are shown in the accompanying profile.

Two ladders lead off of the hump to 13 tracks, averaging about 1,800 ft. long (which converge through a double ladder hump. In order to provide somewhat longer tracks in this classification yard double turnouts from the ladder at the west end were installed.

The capacities of these yards are about as follows:

Westbound receiving	450	cars
Westbound classification	930	"
Eastbound receiving	465	"
Eastbound classification	1,085	"
Eastbound electric	280	"
Westbound electric	280	"
Total	3,490	"

TABLE 5.—COSTS OF TUNNEL PER LINEAR FOOT OF SINGLE TRACK AND PER CUBIC FOOT OF CONTENTS.
(Exclusive of Contractor's Profits.)

Location.	Linear Feet Single Track.	Area Sq. Ft. within Internal Circumference.	Costs per Linear Foot Single Track.									Costs per Cubic Foot within Internal Circumference.
			Excavation.	Iron and Steel.	Concrete, Class A.	Concrete, Class B.	Concrete, Class D.	Waterproofing.	Ducts.	Miscl.	Totals.	
Westerly approach....	4,264	300.8	$121.54	$2.12	$65.31	$24.25	.....	$9.39	$3.74	$1.36	$227.71	$0.757
Subaqueous	5,334	314.16	32.98	*141.18	64.86	65.59	$14.63	.....	3.26	9.79	332.29	1.057
Easterly approach....	7,022	300.8	146.31	2.41	73.68	19.44	.....	7.22	4.13	2.86	256.55	0.853
Total between portals.	16,620	.....	.....	.....	.....	.....	.....	.....	.....	.....	$273.46	$0.896

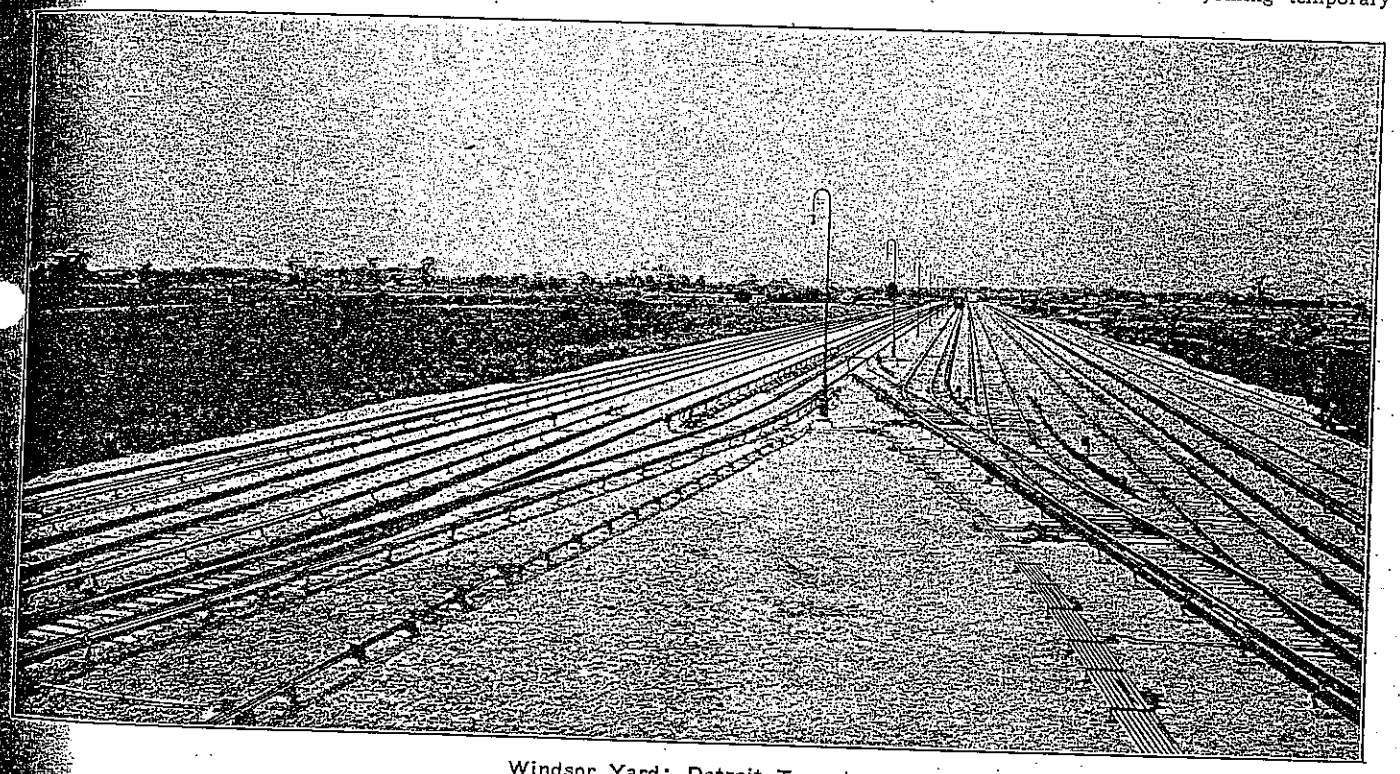
*Plank sides included.

section was carried out in the spring of 1910, with the result that the minor leaks that had resulted from imperfect calking and waterproofing were closed, the total leakage between portals in both tunnels being less than 10 gals. per minute, equivalent to 0.85 gals. per day (24 hours) per linear foot of single bore.

While there were on the subaqueous section a number of casualties incidental to the magnitude of the work, such as carelessness of employees and minor accidents, there was not

slopes of 1 to 1, beyond which no allowance was made for removed material.....40 cts. per cubic yard.
Steam shovels, each.....$5 per day.
Cars, each.....$1 per day.
Scows, derricks and miscellaneous tools.....At prices to cover interest, depreciation and replacement.

It will be noticed in Table 1 that the cost of excavation in the western open cut was $1.33 per cu. yd., as contrasted with 39.3 cts. per cu. yd. in the eastern cut, the difference being due to smaller quantities, a larger proportion of hard digging, and the care required to avoid disturbance of adjoining temporary



Windsor Yard; Detroit Tunnel.

single fatality attributable to the adopted method of construction, nor, of course, was there any trouble with "bends," the use of compressed air, except for divers, was avoided.

COST FIGURES.

The history of an undertaking like the Detroit river tunnel would be incomplete without a statement of costs of the portions of the work that involved the use of new methods. The approximate quantities and actual costs of the tunnel-construction, exclusive of contractor's profits, are given in Table 1, these being taken from inspector's reports, with 15 per cent. added for overhead charges. The total cost from summit to summit will be seen to amount to $4,775,306.

The current prices of labor, tools and material were as follows:

Unskilled labor .....15 to 30 cts. per hour; average 18½ cts. per hour.
Skilled labor .....25 to 45 cts. per hour; average 32½ cts. per hour.
Cement .....$1.16 to $2.25 per barrel; average $1.35 per barrel.
Sand and gravel.....60 cts. per cubic yard.
Steel tubes delivered on site of work.....5 cts. per pound.
Dredging based on "pay quantities," with

track-supports at the former place. In the approach-tunnels the use of compressed air on the Canadian side largely accounts for the cost of $5.54 per cu. yd. for excavation as compared with $4.73 on the Detroit side. The subaqueous cost of 50c. per cu. yd. includes dredging, coffer-dam excavation, backfilling, riprap and other work connected with the excavation and refilling of the trench, with the exception of the coffer-dam itself, which is included under "Miscellaneous."

The item of iron and steel appears most prominently in the subaqueous section, where 5,000 tons was required in the tubes and the balance, 528 tons, in grillages and reinforcing rods. The approximate cost of the tubes in places was:

	Net Cost per Ton.
Steel tubes delivered on side ready for sinking.....	$112.00
Labor of sinking and placing.....	8.40
Plank sides	6.10
Overhead charges (15 per cent.).....	19.00
Total	$145.50

The cost of concrete per cubic yard varied, of course, with the classification and with the

top. It is evident that gases from within the cell can get out, but impurities, air, etc., from without cannot get into the cell.

The method of assembling plates on steel connector rods with steel spacing washers, all being attached to the terminal post, is shown in one of the illustrations. The posts are turned up from steel bar stock, the top of the terminal being tapered and ground to an exact fit with the terminal lug. The tip of the post is threaded to take a nut which holds down the lug. The terminal posts are effectually insulated from the cover by means of hard rubber washers and bushings. A soft rubber washer, used for packing to prevent the solution from creeping, also serves as an insulator. This packing washer is held down by a heavy hard rubber gasket threaded into a pocket on the cell cover. The rubber gasket at the positive pole is red in color while that at the negative pole is black. The positive pole is further distinguished by a plus mark stamped into the steel cover.

The terminal lug is a drop forging of steel, bored and reamed and ground to a taper, to fit the tapered top of the terminal post. The connecting link between the two lugs is of copper. The copper link is swedged into the lug forgings, making a perfect and permanent contact. These links are made in various lengths to suit the spacing of the different size cells. After the swedging, the link with its lugs is given a heavy coating of nickel. Car-lighting men will appreciate the Edison method of connecting and disconnecting cells. No cutting of lead straps is necessary, nor is there any lead burning to be done. Remove the side slats, unscrew two nuts and lift the cell out of the set.

The electrolyte does not vary in density as does the acid electrolyte in a lead battery, nor is the capacity of the Edison battery affected by slight variations. Frequent specific gravity readings are, therefore, unnecessary. For convenience a special cell filler has been designed which rings a bell when the electrolyte has reached the proper height in the container.

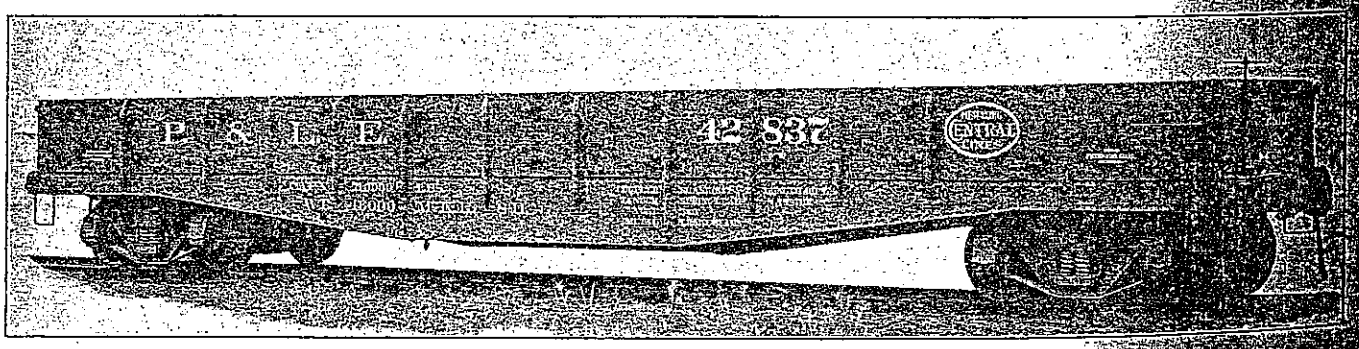
There is no acid used in the Edison cell, and consequently no acid fumes are given off, nor is there any corrosion.

The cells are assembled in wooden trays with pressed steel cradles suspended from the sides. The flange on the bottom of each cell fits into a groove in the cradle, and a pressed steel "hold-down" at the top keeps it rigidly in position. The tray is designed with an air space beneath the steel cradles, making the grounding of cells impossible, unless a great amount of dirt is allowed to accumulate. The

COMPOSITE GONDOLA CAR.

The New York Central Lines have recently received 1,000 composite gondola cars from the Pressed Steel Car Company, Pittsburgh, Pa., which are designed to handle pipe and structural steel. They are 46 ft. long and are constructed to carry a 110,000 lb., uniformly distributed load, with a possible 10 per cent. overload. With these cars it is possible to load two tiers of 22 ft. pipe, whereas with old 40 ft. and 42 ft. cars but one tier could be loaded. The cars are equipped with drop ends, in case it should be desired to load material of more than 46 ft. in length, and are made strong enough to carry ½ of the rated capacity concentrated over a space 10 ft. long at the center of the car.

The underframes are of the built-up type with two center sills 30 in. deep at the center and 12 in. deep over the bolsters and two side sills 26 in. deep at the center and 10 in. deep over the bolsters. The center sills are made of ⅜ in. thick steel plates and each sill is reinforced at the bottom with two 3½ in. x 3½ in. x ½ in. angles, and at the top by one 3½ in. x 3½ in. x ⅜ in. angle, the two sills being tied together by a cover plate ⅞ in. thick by 21¼ in. wide. The center sills are continuously through the body bolsters, and the draft sills which are made of ⅜ in. pressed steel are spliced to them immediately in front of the bolster. The side sills are made of ⅝ in. steel plates and are reinforced at the top and bottom by a 4 in. x 3½ in. x ½ in. angle. They extend from end to end of the car and are connected to the end sill by an



46-Ft. Composite Gondola Car.

pressed steel sub-side sills. The end sills are made of [illegible] channels with a 7/16 in. pressed steel angle cover plate [illegible] to the top flange.

The body bolster is made of pressed steel diaphragms [illegible] back to back with a top cover plate of ¾ in. steel [illegible] and a bottom cover plate of ½ in. steel [illegible] riveted to the flanges. The ends of the body bolsters are fastened to the side sills with two 6 in. x 4 in. x ⅜ in. angles. There are two cross bearers near the center sills of the car, made up of ¼ in. pressed steel plates flanged on the [illegible] with a ⅜ in. top cover plate 10 in. wide passing through [illegible] web of the center sills immediately under the top [illegible] angles, and a bottom cover plate of the same [illegible] the center sills and riveted to the flanges of the [illegible] and center sill bottom angles. In addition to the [illegible] there are 8 sets of floor supports made of ¼ [illegible] extending between the center and side sills.

The floor is made of 2½ in. yellow pine [illegible] grooved, and the sides of 3 in. [illegible] in. x 3 in. x ¼ in. protection angle and [illegible]

lecord Published Continuously for 50 Years. WINDSOR, ONT., WEDNESDAY, SEPTEMBER 14 1910. The Evening Record Published Continuously for 20 Years.

I WILSON IS ...ORNING

as Seized With mington Sun- es Away.

The Record.)

mber 14.—Rev. Jas stricken with par t of the Methodist ing while conducting services, died this

ily, with the excep well, were with him

take place Friday. ucted in the church ernoon, the remains llowing morning to ground at Walseng k county.

14.—No hope is held of Rev. Jasper Wil ho sank unconscious e Methodist church orning. Since that gentleman has not , except for a short ternoon. Dr. King, cian, announced that a fe ours to live. tily noned from . ans. . Wilson is he home of Rev. A. the omage. y a t. The Galt Ministerial afternoon instructed nvey to Mrs. Jasper r, the sympathy of affliction which has nd, Rev. Jasper Wil e Methodist church,

NG PETITION

e Citizens Pro- ainst Rogers' tion

mpean situation re Nothing further has n Toronto regarding e meantime, a strong circulated throughout against the treatment Mahoney and Cam

ning signed at a rapid tive citizens. Among on the petition are lanna, John Davis, el J. Holton, George Leggatt, Alex. Gow, of Sandwich, Dr. H. James Samson, E. G. McKee and George all the city officials mana have signed will forwarded to

E FORGET."

is clipped from a annual Elks Born, dentally picked up at the city hall. the official pub P. O. E. of Am

dais a ferry

This is a view of the wonderful "hump" system now employed by the M. C. R. at its new Windsor yards, which does away entirely with the old shunting process of distributing cars on various switches. Notice the large number of switches. There are thirty-two fed from the main trunk switch.

M. C. R. Tunnel and Yards Are Well Worth a Visit

New Round House and Repair Shops in Windsor Yards Now Ready—Few Windsorites Realized Vast Amount of Money Spent in Undertaking Just Completed.

Everything is now ready for the opening of the new Detroit river tunnel. The work of laying the third rail, which carries the current to propel the huge and powerful electric locomotives, has been completed, both in the tunnel and at the approaches to the tubes on both sides of the river. Work trains have been going through the tunnel daily for some time past, being drawn by the new electric locomotives, and the first practical use of the tubes will be made shortly, when freight trains will be drawn between Canada and the United States under the Detroit river within a few weeks. Passenger trains will also commence to run through shortly.

For weeks, even months, electricians have been toiling in the dark depths of the tunnel installing wires and switches and lights and the countless other things that go to make up the required equipment. From a point far back in the yards the third rail that will carry the electricity to operate the giant locomotives stretches down to the portals, through the twin tubes, and up on the American side for a considerable distance. The power house is located at the foot of Twelfth street, Detroit, in which are the giant transformers that will handle the electrical current from outside sources.

Few Windsorites realize the tremendous amount of money spent and the great volume of work done in the Windsor yards of the Michigan Central railway. A person may walk from the portals of the tunnel to the extreme end of the yards and see on every hand evidences of the work accomplished. The new repair shops and round house have been finished at a large expenditure of money, while the subway to connect the new depot with Wellington avenue is being rushed to completion

The old round house, coal docks and water tanks are being torn down and removed. The railroad company has no further use for these buildings, which have done service for a good many years.

Work is progressing on the new station, and when this structure is completed, it will represent another invested bunch of M. C. R. greenbacks.

The "hump," which is a considerable distance from the entrance to the tunnel, is well worth a visit. It is here that a large freight train can be broken up and distributed onto 32 tracks in an amazingly short time. A long string of freight cars are pushed up the incline to the "hump," and as soon as they get over the "hump" their own momentum carries them down on the other side. Switches branch off in all directions and at each switch is stationed a switchman. By this system each car is placed just where it is wanted and all this is accomplished without any shunting whatever. This is the most remarkable feature of this wonderful system. The other day a freight train of 79 cars was broken up and distributed on various tracks in about seven minutes.

The Commercial Realty company, a large real estate firm with offices in Toronto and Detroit, have a large tract of property, commencing near the new M.C.R. tunnel station, which has been subdivided into lots. These lots are being sold at a rapid rate to Detroit workmen, who will go back and forth by means of the tunnel. J. A. Yeomans, of Toronto, representing the company, is on the property every day, showing prospective buyers over the division. There are hundreds of Windsorites who have no conception of the work accomplished in and around this vicinity, and it is well worth a visit.

Another American Concern

C. P. R. CHANGES

Montreal Despatches State General Shake-up is Due.

There is to be a shake up on the Western Ontario district of the C. P. R., according to dispatches from Montreal. The shake-up however, will principally affect Toronto and London. Local C. P. R. officials in Windsor state that as far as they know, nothing will transpire out of the ordinary in this city.

The action of the officials at Montreal is the result, it is said, of an investigation held in Toronto recently by Vice-President McNichol. Things were not running to suit him, especially in the freight department.

POLICE MAGISTRATE

J. E. Dobie May be Walkerville's New Offical.

It is altogether likely that Walkerville will have a police magistrate. At a meeting of the Walkerville council last night, J. E. Dobie was endorsed for the position, and the attorney-general will be communicated with immediately regarding the matter.

Mr. Dobie is at present a justice of the peace, but it has long been felt that Walkerville has use for a police magistrate so that the Walkerville cases, which have hitherto been tried before Magistrate Leggatt, of this city, can be settled at home.

HILL'S ATHLETICS THURSDAY

Fast Detroit Team to Meet Local Trolley League Boys.

Hill's Athletics, who play the Windsor team at Wiggle park tomorrow afternoon, might rightly be called the Globe Trotters. This season they have played in almost every town in Michigan and Western Ontario, and have been victorious in nearly all their games. The fans will remember those interesting about three

AMERICAN COLLEGE RECEIVES FORT

Cornell University Will $689,000 by Goldw Smith's Will.

Toronto, Ont., September 14.—university receives $689,000 uncon ally by the will of the late P Gildwin Smith, probated here ye in which the value of the estate cated as $832,859.

"I do this," the will says in r to the Cornell bequest, "to sh affection for the university at th ation of which I had the honor o part; to pay respect to the me Ezra Cornell and to show my att as an Englishman to the union two branches of our race on thi ment with each other and wit common mother."

To relatives and old servants is given. Toronto university Prof. Smith's library valued at Pictures and statuary valued at go to the Art museum of Toronto will confirms the will of Mrs. Smith, bequeathing the Gran Smith homestead, to the city of The succession duties to the government amount to $83,285.

REPUBLICANS DELUGE

Democrats In Maine Have a N All Along the Line.

Portland, Me., Sept. 14.—C returns of the vote for state s and representatives in the elec Monday gave the Democrats s tial majorities in both branche Maine Legislature, which nex will elect a United States Sen succeed Eugene Hale, a Secre State, State Treasurer, Attorn eral and Commissioner of Agri The new legislative body wi probably be called upon to ca the declarations of the Dem party platforms of recent yea re-submit to the people the liqu hibitory amendment to the c tion and to repeal the Sturgis law enforcement act.

According to unofficial comp turns, the Legislature will hav mocratic majority of 36 in joi lot. The Senate will consist of one Democrats and ten Repub and the House will have 88 De and 36 Republicans. The last ture consisted of 122 Republica 60 Democrats, the Republicans fifteen majority in the Senate in the House.

Practically complete return night on the vote for governo Frederick W. Plaisted, Democ 644, and Governor Bert. M. F Republican, 64,912, a plural Plaisted of 8,732, as against a p of 8,064 for Governor W. T. Co publican, four years ago.

Another Democrat Victor

Little Rock, Ark., Sept. 14.—I from Monday's state elections incomplete. The Democrat sta et, however, has been elected majority ranging from 15,000 t Constitutional amendment No. viding for the initiative and dum has probably carried, a by a much smaller majority th mated yesterday.

It is claimed the several that voted "dry" last year, wi a majority for license when returns are recorded.

Rabies Prevalent Over the

Albany, Sept. 14.—State sioner of Agriculture Pearson that rabies had broken out in