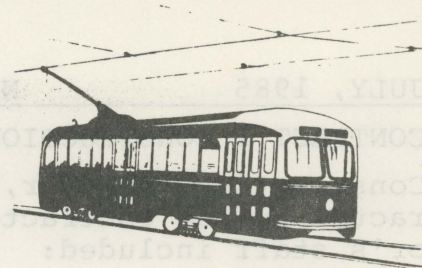


NEW YORK DIVISION

BULLETIN



ELECTRIC RAILROADERS' ASSOCIATION

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- In This Issue: EIGHTY YEARS OF SUBWAY SERVICE TO THE BRONX

EIGHTY YEARS OF SUBWAY SERVICE TO THE BRONX

The first IRT subway train operated to the Bronx eighty years ago, July 10, 1905. To commemorate this anniversary, we are publishing a special issue featuring the history of the construction of the original subway under Contract I. This history was written by the late David Rogoff, who wrote similar construction histories for the "Bulletin" until he passed away in 1969.

This manuscript, which was never published, was recently sent to us by George Horn, our former Vice-President and editor of "Electric Railroads".

CONTRACT I CONSTRUCTION by David Rogoff

Contract I, or the "First Subway", was officially the Manhattan-Bronx Railroad. The \$35 million contract for its construction and operation was awarded to John B. Mc Donald (1844-1911), an experienced contractor who, among other things, built the Baltimore and Ohio Railroad Tunnels in Baltimore. However, Mc Donald was unable to get financing until August Belmont (1853-1924), a prominent banker and agent for the Austrian branch of the Rothschild banking house, was brought into the picture. Belmont organized the Rapid Transit Construction Company, which together with Mc Donald, built the "First Subway".

Included in the contract award to Mc Donald was the operating lease of the subway. In 1902, Belmont organized the Interborough Rapid Transit Company for the operation of the subway, which Mc Donald assigned to Belmont for his share in financing the construction. Belmont, however, found it almost impossible to obtain an operating charter from the New York State legislature, which was then controlled by street and elevated railway interests. Belmont was not easily stopped. He found a small independent street railway in the Bronx with a valid operating charter, the City Island Railroad. He bought the line and had his charter.

Belmont, although a banker, was not a novice in rapid transit. He had interests in the Kings County Elevated Railway of Brooklyn, the Beach Pneumatic Railroad and its successors, the New York Arcade Railway Company, and the New York District Railroad. The Beach line and its successors had vainly attempted to get operational subways built as far back as 1867.

The design and engineering of the "First Subway" was by and under the jurisdiction of the New York City Rapid Transit Railroad Commissioners (or "Board"). The subway structure belonged (and still belongs) to the City of New York, and only the operation of it was leased to the Interborough. Rolling stock also belonged to the Interborough.

Contract Drawings for the "First Subway" were completed and published by the Rapid Transit Railroad Commissioners in 1898. Essentially, they were the work of the third great figure in the history of the subway construction, William Barclay Parsons (1859-1932), then 39 years old. Parsons was the Board's chief engineer and designer. He was quite close to Belmont, as he had been chief engineer of Belmont's New York District Railroad in 1885.

The engineering and design of the "First Subway" was divided into five sections, or "divisions", each in charge of a Division Engineer under Parsons.
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Construction, however, was divided into 15 sections, which were each sub-contracted by the contractor, the Rapid Transit Construction Company. The contractor's staff included:

Chief Engineer - S.L.F. Deyo
Car Designer - George Gibbs
Electrical Director - L.B. Stillwell
General Manager - E.P. Ryan
Mechanical Engineer - J. Van Vleck

Station design was by consulting engineers Heins and La Farge. All stations had two outside platforms and were used by both express and local trains except where noted below. All station platforms were originally to have been 200 feet long (five "old type" IRT car lengths). However, before construction all express platforms below 96th Street station and all platforms from 96th Street north were lengthened to 350 feet (eight old IRT car lengths). Between 1909 and 1911, express platforms were again lengthened, this time to ten old I.R.T. car lengths and local platforms were lengthened to six old IRT car lengths. Since World War II, all active Contract I stations have been lengthened to ten "R" type IRT car lengths, except 145th Street station.

In 1905 and 1906, an extensive investigation was made in reference to complaints of poor ventilation, by Dr. George A. Soper of Columbia University. A lengthy report was issued on February 1, 1906. As a result, additional ventilation shafts were added throughout the length of Contract I construction, and later structures were built with dividing or separating walls between tracks for better air circulation. Brooklyn Bridge station even had a primitive air conditioning system installed on August 29, 1906 (using artesian well water). This air conditioning system has long been abandoned.

The cut and fill sections of the subway were shallow, with the top of the subway usually 30 inches below the street surface to allow space for the conduit street railway yokes then in use. The dimensions for each trackway were 12 feet 4 inches above the top of the rail and 12 feet 6 inches from the center of columns to the face of the sidewall. Duct benches were not used in Contract I construction. A four track section was 50 feet wide. Construction of cut and fill sections consisted of concrete floors ("inverts") and steel roof beams and columns ("bents") usually five feet apart. Small concrete "jack" arches were used between the bents on the walls and the roof. There was also some concrete construction in shallow cut and fill sections and some concrete arch construction in deep cut and fill sections. In addition, there was considerable rock tunneling using either circular or three centerarched roofs and underwater trench tunneling under the Harlem River. The elevated portion of the subway were of the open floor, steel girder type which was cheaper than the solid floor type used in Philadelphia and elsewhere. Elevated structures were used in lightly settled areas to reduce costs. The more expensive subway construction was used in congested areas to avoid traffic interference. See notes on the various sections below. The design of the "First Subway" was based on an assumed motor car weight of 50 tons and a car length of 46 feet.

The maximum grade was three per cent at the Harlem River Tunnels and 2.2% at the Bronx East Side Division portal. The maximum grade under Broadway was, however, not over 1.5 per cent. The maximum curves were 147 feet at City Hall station and 180 feet at East 42nd Street and Park Avenue.

The running rail was originally to have been 80 pound rail fastened to continuous wooden supports, the latter resting on concrete composing the floor. This type of roadbed was actually tested for one quarter mile on the Long Island Railroad near Jamaica, but it was not successful as 100 pound rail and ballasted track with wooden cross ties, which was approved on September 25, 1902.

Pedestrian underpasses were built as part of the original structure at Astor Place, Times Square, and 72nd Street stations. Pedestrian bridges were

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built as part of the original structure at Brooklyn Bridge, 14th Street, Grand Central, 103rd Street, 116th Street (Columbia University), 168th Street, 181st Street, 191st Street, and 149th Street-Grand Concourse (then known as 149th Street-Mott Avenue) stations. Other underpasses were added later at 28th Street and 66th Street stations.

Where space permitted, express stations of the four track sections were built with two island and two outside platforms. This permitted maximum separation of express and local passengers. Stations so built were Brooklyn Bridge, 14th Street, and 96th Street. Space was not adequate at either 72nd Street or Grand Central stations. Local stations were spaced about one quarter mile apart, while express stations were about 1½ miles apart.

According to George S. Rice, the Deputy Chief Engineer under Parsons, the engineers used no upset figure in calculating the capacity of the line, or rather did not plan a road to carry any estimated number of passengers, but planned to give it as great a carrying capacity as the limitations of the line would permit. A statement often made, that the line was designed to carry only 400,000 a day is without backing. It was soon planned, however, to run expresses at longer intervals and with more cars per train than the locals, hence the difference between local and express platform lengths of the actual constructed stations.

The Rapid Transit Construction Company built a 90,000 horsepower power house at 58th and 59th Streets, between 11th and 12th Avenues, and eight substations scattered throughout the "First Subway" area. The contact rail (third rail) selected was that of Wilkes-Barre and Hazelton Railway, constructed only a few years earlier. It used cover boards over the third rail as a safety feature. This required, in turn, a different location for the contact rail than that used on earlier New York City elevated railways and a different type contact shoe.

Originally, all subway stations sold fare tickets at a railroad agent's booth. These tickets were dropped into a hopper on the platform entrance. This ticket system, much like a movie theatre was replaced by nickel (now token) operated turnstiles. The first turnstile was placed in service on May 10, 1920.

Double level elevators were installed at 168th Street, 181st Street, 191st Street, and 149th Street-Mott Avenue (now 149th Street-Grand Concourse) stations. Each of these stations' elevators had two levels. One station platform loaded on the lower elevator level, and the other station platform loaded on the upper elevator level, via a bridge across the tracks. The double level elevators, unique in the subway, have since been replaced by common single level types. The elevators now load only from the upper or bridge platform. The lower platform elevator entrances and exits have been sealed.

"Inclined elevators" (actually escalators) were installed at Manhattan Street (now 125th Street) and 177th Street stations.

Stations on the elevated or "viaduct" sections usually had two outside platforms which had separate controls. Intervale Avenue-163rd Street and the terminal stations were exceptions.

The construction of Contract I and II is very similar. They can be differentiated from others by the absence of duct benches in subway sections and by the presence of rounded columns in local stations (and some express stations) and by rectangular station tile trim and fancy roofs. Contract I and II used ballasted track and small center upright columns with special bulb angles. Some round columns have since been covered by square column falsework.

Cut and fill construction was all done in open cut, without any attempt being made to maintain street traffic. When Contract II construction was in progress, the cut and fill construction was covered over by planking so that traffic and business was unaffected as possible.

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The total length of the "First Subway", as completed, was 21.19 miles (contract I) and 3.35 miles (Contract II)

The route was divided and built as follows:

Section 1 - Ann Street north to the center of Chambers Street. A four track subway under Park Row with a one track loop under the park in front of City Hall. Construction was cut and fill using steel beams and concrete jack arches. Stations built were City Hall (terminal) one outside platform, and Brooklyn Bridge (express), two island platforms and two outside platforms. This section was 0.5 miles long.

The Contract Drawings showed the loop as a two track, two level affair passing around the old Post Office (now the south end of City Hall Park), via the front of City Hall, Broadway and Park Row. The loop station was to have been on Broadway, approximately where the City Hall Station of the BMT is now. This was a complicated and expensive layout which was changed before construction to provide a one level loop with one track for local trains between City Hall and the old Post Office. Two tail tracks were provided for the switching of express trains. There were also two layup tracks immediately west of the tail tracks. All tail and layup track stubs ended separately north of Ann Street. The subway structure narrowed to a two track structure and ended near Ann Street, but tracks were not installed to the end of the structure.

City Hall Station was built centered near the front of City Hall and was the most ornate station of the subway. The station loop was on a 147 foot radius. The loop track connected to the south end of the southbound local track at Brooklyn Bridge station at one end, and to the south end of the northbound local track of Brooklyn Bridge station, after passing under the two layup and two express tail tracks. City Hall station was designed to take on passengers only, passengers were to exit at Brooklyn Bridge station.

The sub-contractor was the Degnon-Mc Lean Contracting Company. Work was begun officially in front of City Hall on March 24, 1900 but actual construction began on March 24, 1901.

City Hall station was abandoned on December 31, 1945, although the loop remained, and is still in service. This section was underpinned at Beekman Street by the IRT "Park Place-Beekman Street" subway.

Section 2 - Center of Chambers Street north to the center of Great Jones Street. A four track subway under Lafayette Street (then Elm Street). This street had been cut through, but was not paved or opened until 1902. Construction was by cut and fill using steel bents and concrete jack arches. Stations built were Worth Street (local), Canal Street (local), Spring Street (local), and Bleecker Street (local). A 600 foot center track or siding was added to Spring Street station after construction began. It was connected to the express track at each end and had third rail. It was removed in 1906 or earlier. This section was 1.13 miles long. The sub-contractor was Degnon-Mc Lean. Work began July 10, 1900. There were some construction delays due to poor ground conditions, part of the route being on the site of the old filled-in Collect Pond near Pearl Street. Worth Street station was abandoned on September 1, 1962 after Brooklyn Bridge station was lengthened and renamed "Brooklyn Bridge-Worth Street".

This section has since been underpinned by the BMT "Broadway Subway" at Canal Street and by the IND Houston Street Subway at East Houston Street. Canal Street is the lowest point on Contract I, exclusive of the Harlem River Tunnels and their approaches. It is below water line.

Section 3 - Center of Great Jones Street north to the center of East 33rd Street plus 100 feet. A four track subway under Lafayette Street (then Elm Place), Fourth Avenue, Park Avenue South (then Fourth Avenue), and Park Avenue (then also Fourth Avenue). Construction was by cut and fill using steel bents and concrete (Continued on Page Five)

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jack arches. Stations built were Astor Place (local), 14th Street (express with two island and two outside platforms), 18th Street (local), 23rd Street (local), 28th Street (local), and 33rd Street (local). This section was 1.50 miles long.

14th Street had two layup tracks, one south of the station on the northbound side and one north of the station on the southbound side. The 18th Street station was closed on November 8, 1948.

The sub-contractor was the Holbrook, Cabot and Daly Contracting Company. Work began on July 12, 1900.

This section was later underpinned by the BMT "14th Street-Canarsie Subway" on East 14th Street, and was later underpassed by the Pennsylvania Railroad Company's tunnels on East 32nd and East 33rd Streets which passed underneath with a clearance of about 36 feet.

Astor Place station was built in large part under what had been private property at the west side of the place, and considerable property had to be torn down for its construction. This demolition resulted in the present large and odd shape of Astor Place.

Section 4 - The "Murray Hill Tunnels" - Center of East 33rd Street, plus 100 feet north to the center of East 41st Street. A four track subway under Park Avenue. This section consisted of two parallel two track tunnels constructed by rock tunneling, except for a few feet south of East 34th Street, where the two tunnels join into a single four track subway built by cut and fill using steel bents and concrete jack arches. No stations were built in this section. This section is 0.38 miles long.

Two separate two track tunnels were chosen for this section in order to avoid underpinning or destroying the much older street railway tunnel also known as the "Murray Hill Tunnel". This latter tunnel had been originally built as an open cut for the New York and Harlem Railroad Company in 1837. It was converted to a tunnel in 1850. On June 11, 1896, it was leased to the Metropolitan Street Railway for 999 years. The street railway tunnel was centered on Park Avenue. The subway tunnels were also to have been centered on Park Avenue and to have been separated by 17 feet of rock. However, before construction, the easternmost tunnel was relocated 21 feet eastward (see Park Avenue Deviation).

The sub-contractor was Major Ira A. Shaler. Work began on August 12, 1900. This section was plagued with accidents (again see Park Avenue Deviations). Major Shaler was killed by rock falling from the tunnel roof on June 17, 1902 and the section was completed by his estate.

The two separate two track tunnels were joined by a cross drift between 37th and 38th Streets for drainage, and by a cross passage between 38th and 39th Streets for a signal tower.

On August 1, 1918, this section was disconnected from the adjoining Section 5 and connected to the newly built IRT "Lexington Avenue Subway". A single track connection into Section 5 was retained for service moves into the southernmost track of the 42nd Street Shuttle (the original southbound local track). This new section required considerable rebuilding (see 42nd Street Shuttle and Contract III Construction).

Section 5A - Center of East 41st Street west and north to the center of West 47th Street. A four track subway under private property, East and West 42nd Street, private property, 7th Avenue, and Broadway. Stations built were Grand Central (express station with two island platforms only) (centered on Vanderbilt Avenue and East 42nd Street), and Times Square (local) (centered at the intersection of West 42nd Street and Seventh Avenue). This section was 0.82 miles long.

This section undercuts the former Airlines Building (then the 21 floor Hotel Belmont) at the southwest corner of East 42nd Street and Park Avenue, the Long-acre Building (1472 Broadway), at the northeast corner of West 42nd Street and Broadway, and the 23 floor New York Times Tower (then the New York Times Build-
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ing) between Broadway, Seventh Avenue and West 42nd Street. Both the Hotel Belmont and the New York Times Building were built at the same time as the subway. The press rooms of the New York Times were located under the floor of the subway and were 27 feet below the top of the rail. They were abandoned as such when the New York Times moved to a new building on West 41st Street, and are now used for storage. The Longacre Building had been built earlier.

Section 5A is currently undercut by the IRT Flushing Line Subway from Grand Central Terminal to Fifth Avenue, by the IND Sixth Avenue Subway at the Avenue of the Americas and by the BMT Broadway Subway at Broadway and West 42nd Street and at Broadway near West 45th Street. The downtown local track of the BMT Broadway Subway is under the uptown local track of the "First Subway".

The sub-contractor was Degnon-Mc Lean. Work began on February 25, 1901. Work was delayed by a series of unsuccessful negotiations with the New York Central Railroad (see Park Avenue Deviation).

On August 1, 1918, this section was broken at the point where the section begins to turn into Seventh Avenue from West 42nd Street. The four tracks north of West 42nd Street were connected instead into the newly constructed IRT Seventh Avenue Subway. A single track connection into Section 5A was retained for service moves into the northernmost track of the 42nd Street Shuttle (the original northbound local track). (See 42nd Street Shuttle).

The route of the "First Subway" was changed to the present "H" type operation on August 1, 1918 (see Contract III Construction). That part of Section 5A on East and West 42nd Street was isolated for operational use and became the present 42nd Street Shuttle of the IRT between Times Square and Grand Central Terminal.

The original shuttle plan had been to connect the Queensborough Subway (see "Electric Railroads" Issue #29) to the two southernmost tracks of Section 5A under East and West 42nd Street, and to use the two northernmost tracks for the actual shuttle. Both the Times Square and Grand Central stations of the "First Subway" were to have been abandoned and replaced with new two track shuttle stations. Track connections were also to have been maintained, in an altered layout, between the shuttle and the present IRT Lexington Avenue Subway for non-rush hour trains between Times Square and Brooklyn.

A new shuttle terminal at Grand Central was actually built east of the original station, but the tracks were never installed. Instead, the track pits were boarded over and the terminal became the present passageway between the original station and the IRT Lexington Avenue Subway Mezzanine. The boards were removed and the track pits filled in, and the new passageway was placed in service on March 18, 1946.

A diamond crossover was to have been built west of the new shuttle terminal between the two north tracks (northbound local and express tracks). This crossover would have replaced a single crossover leading from the then northbound local to the northbound express track of the "First Subway" which had been removed in order to build the new and unused terminal. However the new crossover was never built, and the northbound local track was left isolated from the other three tracks of the shuttle. To this day, trains are still brought in and out of the north track via a makeshift track connection at Times Square between the shuttle and the present IRT West Side Subway. This requires the removal of a temporary station platform. The other two tracks of the shuttle are connected by crossovers at the west end of the original station, which is still in use, at Grand Central station. Trains are brought in and out of these two tracks via a single track connection left intact from the original "First Subway", between the south track (former southbound local) of the shuttle and the southbound local track of the present Lexington Avenue Subway under Park Avenue.

The former southbound express track of Section 5A under East and West 42nd Street was abandoned and torn up in 1975. The original Times Square station of
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the "First Subway" was converted to a terminal station by boarding over the former southbound express track pit and building a wooden bridge across the track bed of all four tracks. The temporary wooden planking is still in use, although innumerable plans have been suggested to rebuild or replace the shuttle with moving belts, etc. Grand Central station of the "First Subway" is used today as a terminal station with the former southbound express track pit boarded over and used as a platform. The former northbound local and express tracks end at bumpers at the end of the station.

Park Avenue Deviation - The original construction contract called for a track connection from the subway into the various railroads at Grand Central Depot (now the site of Grand Central Terminal). This would have enabled the subway to operate through service into various suburban areas north of the city over trackage owned by the New York Central and Hudson River, the New York and Harlem, and the New York and New Haven Railroads. The plans for the actual construction were, however, not included in the Contract Drawings, but were left for future development in conjunction with the railroads concerned.

Accordingly, discussions were held in 1900 with the New York Central and Hudson River Railroad, owner of the Grand Central Depot. The railroad agreed to the connection only if it were not made on railroad property. They explained that they had plans to develop a future lower level at the Depot for suburban traffic, using electricity or compressed air as motive power. The city and the subway people, however, believed that to so locate the connection would be prohibitory in cost and would not provide adequate service.

Meanwhile as negotiations progressed, Parsons designed Section Four to allow for a connection into Grand Central Depot, as he knew it. The Contract Drawings placed the 2 two track subway tunnels centered under Park Avenue (then Fourth Avenue), only 17 feet apart, which was insufficient to make an adequate three or four track connection into the station without crossing each other at grade. To remedy this, he moved the easternmost tunnel further east until it almost abutted the east building line of Park Avenue. The westernmost tunnel was left as shown on the Contract Drawings. Moving the easternmost tunnel put about 21 feet of rock between the subway tunnels, adequate for a tight clearance three track depressed connection to be built between the tunnels. A fourth track was to connect into the present northbound local main line track at grade. After the three tracks had arrived between the two subway tunnels, the westernmost track was to pass under or over the two southbound main line tracks to connect into the present southbound main line local track.

The easternmost subway tunnel was relocated before construction and without publicity or notice to the adjoining property owners. Pending completion of negotiations with the New York Central and Hudson River Railroad, he made no other changes to Section Four except relocation of the easternmost subway tunnel. Nobody would have noticed any changes in the plans except that on January 27, 1902 there was a dynamite explosion in a contractor's shanty on the street surface at the east side of East 41st Street and Park Avenue. Five people were killed and there was considerable damage to adjoining property on the east side of Park Avenue. There were also rock slides inside the tunnels on March 20th and 21st at 37th and 38th Streets and Park Avenue. The property owners investigated, found the tunnels were not being built as per original Contract Drawings and sued for damages because of what they called the "Park Avenue Deviation". They claimed that had the tunnel been dug as originally planned, away from the east building line, their property would not have been affected, and that they were not notified of any changes.

Parsons defended the changes in the plans under a broad interpretation of the original contract. The case dragged for years before being settled. Even after the settlement, the tunnel was not relocated, as it had been long completed (Continued on Page Eight)

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completed. In the meantime the negotiations with the railroad had stalled, and they never were resumed. The space between the 2 two track subway tunnels was however used finally for a two track connection into the IRT Lexington Avenue Subway on August 1, 1918. The other two tracks of this latter connection were made by other means. Another result of the relocation of the easternmost tunnel was to introduce a slight shifting of the two northbound tracks eastward, just north of the 33rd Street station.

Section 5B - Center of West 47th Street north to the center of West 60th Street. A four track subway under Broadway. Construction was by cut and fill using steel bents and concrete jack arches. Stations built were 50th Street (local), and 59th Street (Columbus Circle) (local). This section was 0.69 miles long. This section has since been underpinned at Eighth Avenue by the IND Eighth Avenue Subway and at 53rd Street by the IND 53rd Street Subway. The sub-contractor was Naughton and Company. Work began on September 19, 1900. This section underpinned the Columbus statue at Columbus Circle & the 6th Ave. "L" at 53rd Street.

Section 6A - Center of West 60th Street north to the center of West 82nd Street. A four track subway under Broadway. Construction was by cut and fill using steel bents and concrete jack arches. Stations built were 66th Street (local), 72nd Street (express) (two island platforms only), and 79th Street (local). This section was 1.20 miles long.

The sub-contractor was William Bradley. Work began on August 22, 1900. This section underpinned the Ninth Avenue Elevated Line at West 64th Street.

Section 6B - Center of West 82nd Street north to the center of West 104th Street. A four and six track subway under Broadway on a single level from West 82nd Street north to West 101st Street, thence on two levels to West 103rd Street, and one level to West 104th Street. Half way between 96th and 97th Streets the two center express tracks descend, spread into three tracks, and swing to the east, leaving Section 6B at the east building line of Broadway. The point at which the center tracks descend is the beginning of both the "West Side Branch" (outer or local tracks) and the "East Side Branch" (center or express tracks). The upper level, after the loss of the two center tracks, expands by switches to three tracks, halfway between West 100th and West 101st Streets and so continues to the end of the section at West 104th Street. Construction was by cut and fill using steel bents and concrete jack arches. Stations built were 91st Street (local) (abandoned on February 2, 1959), 96th Street (express) (two island and two outside platforms) (outside platforms subsequently abandoned), and 103rd Street (local) (upper level only). This section was 1.07 miles long.

The "West Side Branch" was originally planned as a two track line and construction was begun as such. However, it was soon decided to add a third track to the branch through 137th Street station (see "West Side Branch Reconstruction" below). As a related part of this construction, a third track was added to both the upper and lower levels, immediately east of the two tracks originally planned for each level. As a result the 103rd Street station was not centered on the center line of Broadway. The third track of the lower level was located immediately under the easternmost upper level track and ran underneath this track as far as the turnoff into Section Seven where it rejoined the original lower level northbound track. This lower level track was apparently connected to the main line northbound track at its north end only, although space was left for a switch at the south end. It was known as the "Lenox Stub" and apparently was used only for storage and layups. It was subsequently removed and its space is now used for storage. As originally built there was no crossover between express tracks north of 96th Street station.

The sub-contractor was William Bradley. Work began on August 22, 1900.

"96th Street Improvement" - A project related to the building of Section 6B.

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CONTRACT I CONSTRUCTION - (Continued from Page Eight)

Section 6B was built with diamond crossovers north of 96th Street station between the local and express tracks of each direction. As express and local trains were operated into both branches, these crossovers became a serious bottleneck, especially during rush hours. A "96th Street Improvement" was authorized in 1908 to eliminate the bottleneck by adding one track to the east and two tracks to the west of the subway between West 96th Street and West 102nd Street, together with necessary underpass (fly-under) tracks and switches. Contract Drawings were prepared and work was almost ready to begin when the project was dropped suddenly in 1909 in favor of better signalling north of the 96th Street station. "Better signalling" was not a permanent cure, and by 1959 it was necessary to eliminate the use of the diamond crossovers altogether, by routing all local trains to the "West Side Branch" and all expresses to the "East Side Branch". A diamond crossover was added in April, 1958 between the two center tracks north of 96th Street station.

East Side Branch - Section 7 - "Central Park Tunnel" - Beginning of rock tunnel at West 103rd Street, east to the center of West 110th Street. A single two track tunnel under private property, West 104th Street, and the northwest corner of Central Park. Construction was by rock tunneling except for a small section of cut and fill using steel bents and concrete jack arches near Lenox Avenue. No stations were built on this section, although a station at Eighth Avenue (now Central Park West) was authorized during construction, but soon was dropped. This section was 0.87 miles long. It passed below the IRT Ninth Avenue Elevated Line on Columbus Avenue. As the section was in deep tunnel no underpinning was necessary. The section, however, later underpinned the IND "Eighth Avenue Subway" at Eighth Avenue (now Central Park West).

The sub-contractor was Farrell and Hopper. Work began on October 2, 1900. Section 8 - Center of West 110th Street north to the center of West 135th Street plus 100 feet. A two track subway under Lenox Avenue in the Harlem district of Manhattan. Construction was by cut and fill using steel bents and concrete jack arches. Stations built were 110th Street (single island platform), 116th Street, 125th Street, and 135th Street. This section was 1.28 miles long.

Lenox Avenue is a wide street, currently with two roadways separated with a small island. When Section Eight was being planned, what is now the east roadway was used by a two track conduit street railway. The subway was therefore built under what is now the west roadway to avoid underpinning the conduit tracks. Contrary to rumor, the Lenox Avenue section was not built under one side of the street to allow for future four-tracking of the line. The 135th Street station has a third center layup track connected by trailing point switches to both main line tracks beyond the station limits.

The sub-contractor was Farrell and Hopper, but the major part of the section was relet to John C. Rodgers. Work was begun on August 30, 1900.

Section 9A - A point north of the center of West 135th Street north and east to the east building line of Gerard Street in The Bronx. A two track subway under Lenox Avenue, private property (now the Col. Charles Young Playground), the Harlem River, and East 149th Street. Construction was by rock tunneling, except under the river, where trench tunneling was used (for the first time in the United States), and a small cut and fill section using flat side roofs and walls reinforced by steel rods ("reinforced concrete") south of the Harlem River. Stations built were 145th Street (terminal with two outside platforms) (see Lenox Avenue Extension below). This section was 0.78 miles long.

The sub-contractor was McMullen and McBean. The work began on July 10, 1901 and construction was delayed by consideration of possible route change in the adjoining Bronx section.

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"Lenox Avenue Extension" - Also known as the "148th Street Connection" and the "East Side Terminal". Part of Section 9A which was added to the original contract plans in 1903 during construction. The Contract Drawings showed the route of this section going directly to The Bronx from West 135th Street. Later it was decided to add an extension up Lenox Avenue to an outside yard and shops, "148th Street Yard", at the Harlem River. This yard was the major yard on the system for years. It had 33 tracks, each 600 feet long. The extension up Lenox Avenue was to be two tracks under Lenox Avenue as far as a portal at West 148th Street (then Exterior Street) at which point the yard began. As this extension was an afterthought, its connections to the mainline were at best a compromise consisting of a two track crossing at grade, leaving the two mainline tracks near West 142nd Street. The difficulty of building a burrowing junction (fly-under) track so near the river, in soft ground, probably dictated this type of connection. It is the only main line operational single level track crossing in the entire IRT Division.

"The Harlem River Tunnels" - Part of Section 9A constructed by trench tunneling (the first time in the United States). The tunnels consist of a pair of cast iron tubes, joined together by a single iron wall, much as siamese twins. The outer shell is encased in concrete. Trench tunneling is much more economical than rock tunneling and was possible only because of several fortunate circumstances. First, the length of the tunnel was relatively short, about 610 feet. The actual distances between pierheads was even shorter, about 400 feet. Also, the Corps of Engineers did not insist on a very deep boat channel (as they did later, on all the East River Tunnels). Deep channels usually mean deep tunnels, which in turn mean rock tunneling. The Harlem River Tunnels were built in two sections. The first, or Manhattan end, was built as follows. First, a trench was dredged deep enough to permit construction of the upper part of the tunnel. Walls were erected at each side of the trench by pilings. The tops of the pilings were then cut off under water and a wooden box was sunk so that it rested on the sawed off pilings. The box was then covered by earth and the tunnel was then assembled under the roof under compressed air. The contractor was not completely satisfied with this method of construction so the Bronx end was built as follows. The trench and wall pilings were constructed as before, but the top half of the tunnels were coated with concrete, preassembled, and sunk as a roof for the remainder of the tunnel under compressed air. In this method, no wooden roof for construction was required. The entire tunnel is below the bottom of the river, the trench having been backfilled to pre-tunnel river bed level.

The approaches to the Harlem River Tunnels in both Manhattan and The Bronx were constructed by rock tunneling. The maximum depth below mean high water is about 47 feet (bottom of tunnels). The depth of water required over the tunnel for navigation purposes was only 26 feet which corresponds closely with the actual depth of water in mid-channel.

A station was built on the extension, "145th Street". This had outside platforms and was similar in appearance and layout to the local stations on the section. Until May 5, 1968, it was used strictly as a Manhattan terminal for trains not continuing to The Bronx. Normally trains going into the 145th Street station crossed over into the south (west) track, south of the station and used the west platform for both discharging and taking on passengers. An occasional train, ending its run, however, continued up the northbound (east) track, discharged its passengers at the east platform, and then proceeded directly into the yard. The east platform of the 145th Street station has no controls and all its kiosks were marked "EXIT ONLY". The station has been badly neglected and its platforms have never been extended to current lengths. Extensions of the Lenox Avenue Extension have been proposed running through the yard and alongside the Harlem River to the now-abandoned Polo Grounds Shuttle.

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Instead, a new station called 148th Street-Lenox Terminal, located at 149th Street and Seventh Avenue was opened to the public on May 13, 1968, and 145th Street became just another through station. Trains operated light to 148th Street from May 5th to May 13, 1968.

Construction on both the original part of Section 9A and the Lenox Avenue extension was mainly by cut and fill using steel bents and concrete jack arches. There were, however, several small parts which were constructed by cut and fill but using concrete walls and roofs reinforced by imbedded steel rods (reinforced concrete). This was the first use of reinforced concrete construction on the subway. It was later used in parts of Section 9B, and to a much greater extent in the Contract II Construction of the IRT Subway.

Section 9B - East building line of Gerard Avenue, east to Brook Avenue, just beyond Third Avenue, where the steel viaduct elevated begins. A two track subway under East 149th Street, Third Avenue and Westchester Avenue. Construction was by cut and fill using concrete arch at the Gerard Avenue end, and by cut and fill using reinforced concrete at the other. Stations built were Mott Avenue (called "Mott Avenue-149th Street") and Third Avenue (called "Third Avenue-149th Street"). This section was 0.72 miles long.

The contract drawings called for a portal west of Third Avenue on Westchester Avenue, which would have blocked cross traffic on Bergen Avenue. However in 1902, after some work had begun, it was decided to reduce traffic interference by placing the portal and embankment leading to it, on private property just south of the original site on a block bounded by Westchester Avenue, East 149th Street, and Brook Avenue.

Mott Avenue-149th Street station was to have been built by rock tunneling, but bad rock faults made it necessary to construct the station in an enormous cut, the largest on the whole subway, and to roof the station with a single concrete arch. The remainder of the section was in cut and fill, but was built with reinforced concrete. Construction was delayed by consideration of a possible route change in The Bronx.

Mott Avenue became the Grand Concourse Extension on March 13, 1934 and the station signs were accordingly altered to read "Grand Concourse-149th Street". A platform extension was originally planned at the east end of the Mott Avenue station to provide a pedestrian connection to a proposed adjoining New York Central station. Work was actually begun, but was never completed, as the New York Central station plan was dropped in the planning stage. The west end of the station was cut back somewhat during Dual Contract construction to allow for a track connection from the Lexington Avenue Subway. This section underpinned the Third Avenue Elevated Line at Third Avenue and the New York Central and Hudson River Railroad between Anthony Griffin Place and Park Avenue. The sub-contractor was John C. Rodgers. Work began on June 13, 1901.

Section 10 - "East Side Viaduct" - West side of Brook Avenue east and north to the Bronx Park and East 181st Street. A three track steel elevated structure over Westchester Avenue, Southern Boulevard, and Boston Road. Stations built were Jackson Avenue, Prospect Avenue, Simpson Street, Freeman Street, East 174th Street, East 177th Street, and Bronx Park-180th Street (terminal) (single island platform). Simpson Street station was originally planned as Fox Street station.

The sub-contractor was Terry and Tench. The viaduct foundations were by E.P. Roberts. Work began on August 19, 1901. This section was 3.13 miles long.

This section was originally to have been two tracked, but it was changed to three tracks in 1902. At the west end, however, it was built with four tracks between the portal and Jackson Avenue. The inner two tracks connected to the Third Avenue Elevated via Westchester Avenue at Brook Avenue into St. Ann's Avenue. This connection to the El was authorized in 1903 and enabled elevated
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trains to operate on the section before the adjoining Section 9B was completed. (See "Electric Railroads" Issue #25 - "New York's El Lines").

There was to have been an elaborate terminal at Bronx Park and 182nd Street. The Park objected violently to a station abutting a Park property and a temporary terminal was built at 181st Street instead. Finally a new and permanent station was built at 180th Street (single island platform) called "180th Street-Bronx Park" and was opened on October 28, 1910.

Another station, Intervale Avenue-163rd Street, was added to the line on April 30, 1910 after the opening of the "East Side Viaduct". Section 10 also included the large twelve track West Farms elevated inspection and storage yard, built at the east side of the structure just north of the 177th Street station.

Bronx Park-180th Street station, together with most of the elevated structure between it and 177th Street station, was torn down after abandonment on August 4, 1952, as was West Farms Yard.

The center track of the "East Side Viaduct" was built to provide non-rush hour storage and layups and rush hour express service to connect with both the New York, New Haven and Hartford Railroad and the New York, Westchester and Boston Railroad. The latter line was then in the planning stage and was not operated until 1912. A direct track connection to these suburban railroads was even envisioned for the future. On March 3, 1917 the "White Plains Line" was built and connected to the viaduct as part of "Contract III Construction". Express operation on the "East Side Viaduct" actually began on April 23, 1953.

A second connection from the "Third Avenue Elevated Line" (the "Bergen Avenue Cutoff") was built by July 1, 1917. It connected into the upper level tracks of Section 10, east of Third Avenue, and East 149th Street at grade. Service was discontinued on November 5, 1946, and the structure was torn down in the summer of 1950. (See "Electric Railroads" Issue #25 - New York's El Lines).

This section underpinned the "Bergen Avenue Cutoff" from the portal to Brook Avenue. Section 10 was underpinned by the New York Central and Hudson River Railroad's Spuyten Duyvil and Port Morris Division between Brook and St. Ann's Avenues on Westchester Avenue.

West Side Branch - Section 11 - Center of West 104th Street north to the south side of La Salle Street (then West 125th Street) plus 10 feet. A three track subway under Broadway. Construction was by cut and fill using steel bents and concrete jack arches from West 104th Street to West 116th Street, and by cut and fill with a single concrete arch roof north to La Salle Street. Stations built were 110th Street (Cathedral Parkway), 116th Street (Columbia University). This section was 1.07 miles long.

The sub-contractor was John Shields. Work began on June 18, 1900. This section was rebuilt as part of the "West Side Branch Reconstruction" (see below). Section 12 - "Manhattan Valley Viaduct" - South side of La Salle Street (then West 125th Street) plus 10 feet north to the north side of West 133rd Street. A three track steel and masonry viaduct over Broadway. Stations built were Manhattan Street (now 125th Street). This section was 0.41 miles long.

Broadway, at this area of the west side of Manhattan, is situated in the deep "Manhattan Valley". The lowest point is West 125th Street (then called Manhattan Street) which crosses Broadway on a diagonal. A subway under Broadway at this area would have been possible, but would have meant steep grades and difficult construction. It was therefore decided, very early in planning, to cross the valley on a viaduct. The Contract Drawings showed this section as a series of plate girder spans on steel towers. It was found, however, that to build the crossing of West 125th Street (then Manhattan Street) in such a manner would have meant an almost complete rerouting of the very complicated street railway layout at the intersection of the current West 125th Street and Broadway. The crossing of the current West 125th Street was, therefore, revised before construction, to substitute a two hinged arch steel viaduct. The span of the arch was 168 feet
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and the top of the rail was 55½ feet above the street surface at the present West 125th Street. The section north and south of the actual arch consisted of conventional steel plate girder construction on concrete or steel abutments. The extreme ends of the section consisted of graded embankments leading to simple portals just south of West 122nd Street and just south of West 135th Street.

On April 24, 1921 the name of Manhattan Street was changed to 125th Street. The street's name was changed to West 125th Street. The original West 125th Street, in this section, was renamed La Salle Street. The station signs were repainted with each name change.

The sub-contractor was Terry and Tench. Foundations were by E.P. Roberts. Work began on June 1, 1901.

"Fort Lee Connection" - A proposed two track steel elevated connection beginning at the portal at West 122nd Street in Section 12, thence two tracks above Broadway north to the present West 125th Street, thence one track turning west and crossing under the viaduct, thence both tracks going west on the present West 125th Street to the Fort Lee Ferry on the Hudson River. The connection was to have been built with one track each along each side of the viaduct. Although extensive plans were completed and the route was authorized in 1903, it was never built.

Section 13 - North side of West 133rd Street to the center of West 182nd Street plus 100 feet. A three and two track subway under Broadway and St. Nicholas Avenue, passing through the middle of a five track underground storage ("terminal") yard between 137th Street and 145th Street stations. Construction was by cut and fill using steel bents with concrete jack arches through the 145th Street station and by rock tunneling and short sections of cut and fill with concrete arches north to the end of the section. The cut and fill section has three tracks, the rock tunneling and arch section has two. Station built were 137th Street-City College (terminal for some trains), 145th Street (local), 157th Street (local), 168th Street (local), and 181st Street (now 181st Street-George Washington Bridge) (local). All these stations had two outside platforms, 145th Street had a third or center track for layups. This section was 2.42 miles long.

The underground storage yard ("137th Street Yard") was to have been built with three tracks alongside each side of the two track main line tracks. However, when the section from 103rd Street station to 145th Street station was third tracked, the yard track immediately east of the original northbound main line track became the present northbound main line track, leaving the yard with three tracks to the west, but only two tracks to the east of the present three main line tracks. (See "West Side Line Reconstruction" below)

The sub-contractor was L.B. McCabe and Bros. Work began on May 14, 1900. McCabe defaulted on the contract and was replaced on December 1, 1901 by his superintendent, Rufus C. Hunt.

The rock tunnel from 158th Street to Dyckman Street at the north end of Section 14 is about 2¼ miles long and is the longest single tunnel in the subway system. This section later underpinned the IND "Eighth Avenue Subway" at the confluence of St. Nicholas Avenue and Broadway.

"West Side Reconstruction" - A replanning and rebuilding of parts or all of Sections 6B, 11, 12, and 13. Under the terms of the original contract, the contractor was to build an underground "terminal" (storage yard) in Section 11 at a location of his own choosing. The contractor, however, decided to build the yard between the 137th Street and 145th Street stations (see above) in Section 13. It was also decided to third track the line from just south of 103rd Street station through 145th Street station to provide express service in rush hours, layup space in non-rush hours, and to simplify track access between the four track section north of 96th Street station and the yard. However, track construction was partially completed in Sections 11 and 13, and it was therefore
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necessary to add the third track on one side of the existing structure, without regard to centering the subway on the center line of Broadway. It was decided to put the third track on the east side of the subway, where it is today, as the present main line track. Adding the third track posed many difficulties. Section 11 was built as a single two track subway with a concrete arch roof. In order to add a new track, it was necessary to blast out the roof and side walls and replace them with new walls and a larger arch, all without disturbing the two tracks already in place. This was quite an engineering feat. Section 12, the Manhattan Valley Viaduct, fortunately had not been constructed and its designs were revised to center the viaduct on the center line of Broadway. Section 13 and the small part of Section 6B affected were constructed in cut and fill with steel bents and concrete jack arches and reconstruction was relatively simple. However, as Sections 6B, 11, and 13 were not centered on the center line of Broadway, while Section 12 was, it was necessary to introduce a slight shift of all three tracks westward, just inside each portal.

Section 14 - "Fort Washington Tunnel" - Center of West 182nd Street plus 100 feet north to Hillside Avenue. A two track subway under St. Nicholas Avenue and private property in the Washington Heights district of Manhattan. Construction was by rock tunneling. The two tracks were in a single arched roof tunnel. No stations were built in this section during the original construction, but 191st Street was added later and opened on January 14, 1911. This section was 0.81 miles long. 190th Street is the deepest point below the street surface of the entire New York City subway system, 181 feet.

The north end of this section was at a portal just south of the present Dyckman Street station. The original route of this section was to have been via a long curve to the west from St. Nicholas Avenue (then 11th Avenue) to Broadway (then Kingsbridge Road). This route was changed in 1901 to divert the route to the east to Nagle Avenue and 10th Avenue (then Amsterdam Avenue) to Broadway. The route change lengthened the Fort Washington Tunnel 500 feet northward, but shortened the adjoining Section 15 viaduct by 1,705 feet.

The sub-contractor was L.B. McCabe and Bros., who defaulted on this section as he did on Section 13. This section was finished by McCabe's superintendent, Rufus C. Hunt. Work began on March 27, 1901 (or March 14, 1900).

Section 15 - "West Side Viaduct" - Portal at Hillside Avenue in the Inwood district, north to West 242nd Street plus 288 feet in The Bronx. A three track steel elevated structure or "viaduct" above Nagle Avenue, 10th Avenue, Broadway, in the Inwood section of Manhattan, the Harlem Ship Canal (commonly misnamed the "Harlem River") and Broadway, in the Riverdale section of The Bronx. Stations built were Dyckman Street (local), 207th Street (local), 215th Street (local), 225th Street (local) (then called Muscoota Street), 231st Street (local), 238th Street (local, and 242nd Street-Van Cortlandt Park (terminus) (one island and two outside platforms). This section as finally built was 2.6 miles long.

The original route of Section 15 was as above only to West 230th Street (then Riverdale Avenue). Here the work went east on West 230th Street and crossed the New York Central and Hudson River Railroad Company Spuyten Duyvil and Port Morris Branch (now the New York Central's "Main Line") and the NYC & HR RR's "New York and Putnam Railroad Branch" (now the New York Central's Putnam Division) and dead ended at the east building line of Bailey Avenue. The Bailey Avenue terminal was to have been a two track, single island, elevated platform station with no provision for any track connection to either of the Kingsbridge stations of the two NYC & HR RR's lines below.

The 225th Street station was, and still is, on a part of Manhattan known as Marble Hill, although the hill is connected by land to The Bronx and not to Manhattan. Marble Hill, however, was originally part of Manhattan Island. At its north, it was separated by the Harlem River and Spuyten Duyvil Creek from The Bronx. In those days, the Harlem River did not reach the Hudson River, but in-

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stead met Spuyten Duyvil Creek, which in turn flowed to the Hudson River. At the extreme northern tip of Marble Hill (Manhattan), a small stream, Tibbet's Brook, fed into Spuyten Duyvil Creek from the north. Much of the Harlem River and practically all of the Spuyten Duyvil Creek was not then navigable. In 1895 the U.S. Corps of Engineers cut the Harlem Ship Canal through Manhattan Island, south of Marble Hill, connecting the Hudson River with a redug and rechanneled Harlem River, making a navigable waterway. The route of Spuyten Duyvil Creek north of Marble Hill was abandoned and later filled in. Most of Tibbet's Brook is now a sewer.

Section 15 was to have crossed the Harlem Ship Canal on the first Broadway Bridge (opened January 1, 1895). This single level double draw bridge was to have been rebuilt with an upper level for the IRT, conduit street railway tracks with widened roadways, and with revised north end abutments to permit a rerouting of the New York Central's Hudson River Division tracks alongside the Harlem Ship Canal and under the bridge. The Hudson Division had previously followed the north shore of the old abandoned parts of the Harlem River and Spuyten Duyvil Creek beds and had a station ("Kingsbridge") alongside the "Kingsbridge" station of the present Putnam Division. Rebuilding the bridge so completely proved to be too complicated, and the bridge had to be replaced with an entirely new bridge also a double draw turntable bridge, but with two levels. The original or first Broadway Bridge, then only 11 years old, was lifted out of its moorings and floated down the Harlem River to West 207th Street, all on one day, June 14, 1906. The second or "new" Broadway Bridge was floated into place and by June 16, 1906 one roadway was in operation. The first Broadway Bridge is still in existence, at West 207th Street, as the "University Heights Bridge". Trains operated over the upper level of the second Broadway Bridge to 225th Street on January 14, 1907.

Dyckman Street station was built with a third track between the station and the "Fort George" portal. This third track, the "Fort George Siding" was on the west side of the two main line tracks and connected into the southbound track at its south end. The north end of the siding had a bumper just short of the southbound platform of the station. The siding was authorized at the same time as the third tracking of the West Side Viaduct. It was probably used for layups and storage, had third rail, and was removed in 1929. Part of its roadbed has since been covered by a platform extension of the southbound platform of Dyckman Street station.

"Van Cortlandt Park Extension" - A change to the route of Section 15, built as extra work. It was a three track steel elevated viaduct over Broadway from W. 230th Street north to West 242nd Street plus 288 feet in the Kingsbridge and Riverdale districts of The Bronx. Stations built were 231st Street (local), 238th Street (local), and 242nd Street-Van Cortlandt Park (now also Manhattan College) (terminal) (one island platform and two outside platforms). Work began on December 1, 1906. This section was 1.0 miles long. Construction was standard steel, open floor, plate girder type.

The extension was originally planned as a separate "Route 14". It was, however, decided to abandon the original 0.11 mile part of Section 15 planned above West 230th Street and to substitute "Route 14" as extra work on Section 15. The change was prompted in part by the desire to give better access to The Bronx, which since the abandonment of part of the old Harlem River and Spuyten Duyvil beds, was now connected by land to Marble Hill, and was expected to grow fast. Also, with the abandonment of the New York Central's Hudson Division's old "Kingsbridge" station, and its replacement with a new station at Marble Hill adjoining the canal and West 225th Street, there no longer existed any traffic potential at a Bailey Avenue Terminal.

An elevated storage yard and inspection sheds ("240th Street Yard") with a total capacity of 185 cars, was built on the west side of the structure at West 240th Street, together with an extra or fourth track parallel and west of the
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three original tracks between West 238th Street and West 240th Street. Work began in November, 1909. The inspection shed opened May 1, 1911.

The "Van Cortlandt Park Extension" was designed with provision for an additional extension north to the city line, which was however, never built. 242nd Street-Van Cortlandt Park station was therefore built to be converted into a regular three track station by removing the center platform which was a temporary wooden structure.

This section crossed the Tippet's Brook at West 240th Street. The brook passed under Broadway in a four arch masonry culvert. As this culvert underpinned several elevated columns, considerable special construction was required. Tippet's Brook at this point is now a sewer.

The delay in building the second Broadway Bridge delayed the construction of Section 15, and it was necessary to open it in sections as follows: 157th Street to 221st Street stations on March 12, 1906; 221st Street to 225th Street stations on January 14, 1907; 225th Street to 230th Street stations on January 27, 1907; 230th Street to 242nd Street stations on August 1, 1908.

Initial operation between 157th Street and 221st Street stations was by two shuttle trains between the stations at 12 and 16 minute intervals. The shuttle trains were abandoned on May 30, 1906 at which time 168th Street station was opened and through service began.

When the line was extended to 225th Street at 12:01 AM January 14, 1907, the temporary 221st Street station was closed and dismantled. It was reassembled at 230th Street, where a temporary station, probably an island platform, was opened at 12:01 AM January 27, 1907. This station was removed after the line was extended to 242nd Street on August 1, 1908. Details of these temporary stations are lacking. The 207th Street station was finished in 1906, but was not opened until April 1, 1907, when the West 207th Street (University Heights) Bridge was opened. The 191st Street station was also built after the beginning of regular operation and was finished on January 14, 1911.

The second Broadway Bridge was damaged by fire on October 11, 1956 and was removed on December 24, 1960. It was replaced with a large single lift bridge (the third Broadway Bridge) on December 26, 1960.

Section 15 was underpinned at West 207th Street by the yard lead tracks of the IND Eighth Avenue Subway going into the West 207th Street Yard.

Free transfers now exist on parts of Contract I Construction as follows:

1. Brooklyn Bridge station to Chambers Street station (BMT)
2. Canal Street station to Canal Street station (BMT)
3. Bleecker Street station to Broadway-Lafayette Street station (IND) (from the southbound side of Bleecker Street only). No transfer from northbound side.
4. 14th Street station to 14th Street and Union Square stations (BMT)
5. Grand Central (original station) to Grand Central stations of both the Lexington Avenue and Queensborough Lines (IRT).
6. Times Square (original station) to Times Square and 42nd Street stations (IRT Seventh Avenue and Queensborough Lines and BMT Broadway Line).
7. 59th Street station to Columbus Circle station (IND)
8. 168th Street station to 168th Street station (IND)
9. 149th Street-Grand Concourse station to 149th Street-Grand Concourse station of the Jerome Avenue Line (IRT).

The following transfer points to the 3rd Avenue "L" have been discontinued:

1. 149th St. - 3rd Ave. station to 149th St. station of 3rd Ave. "L" (1905-1973)
2. Brooklyn Bridge station to City Hall station of 3rd Ave. "L" (IRT) (1950-1953)

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D. Rogoff, July 10, 1962

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