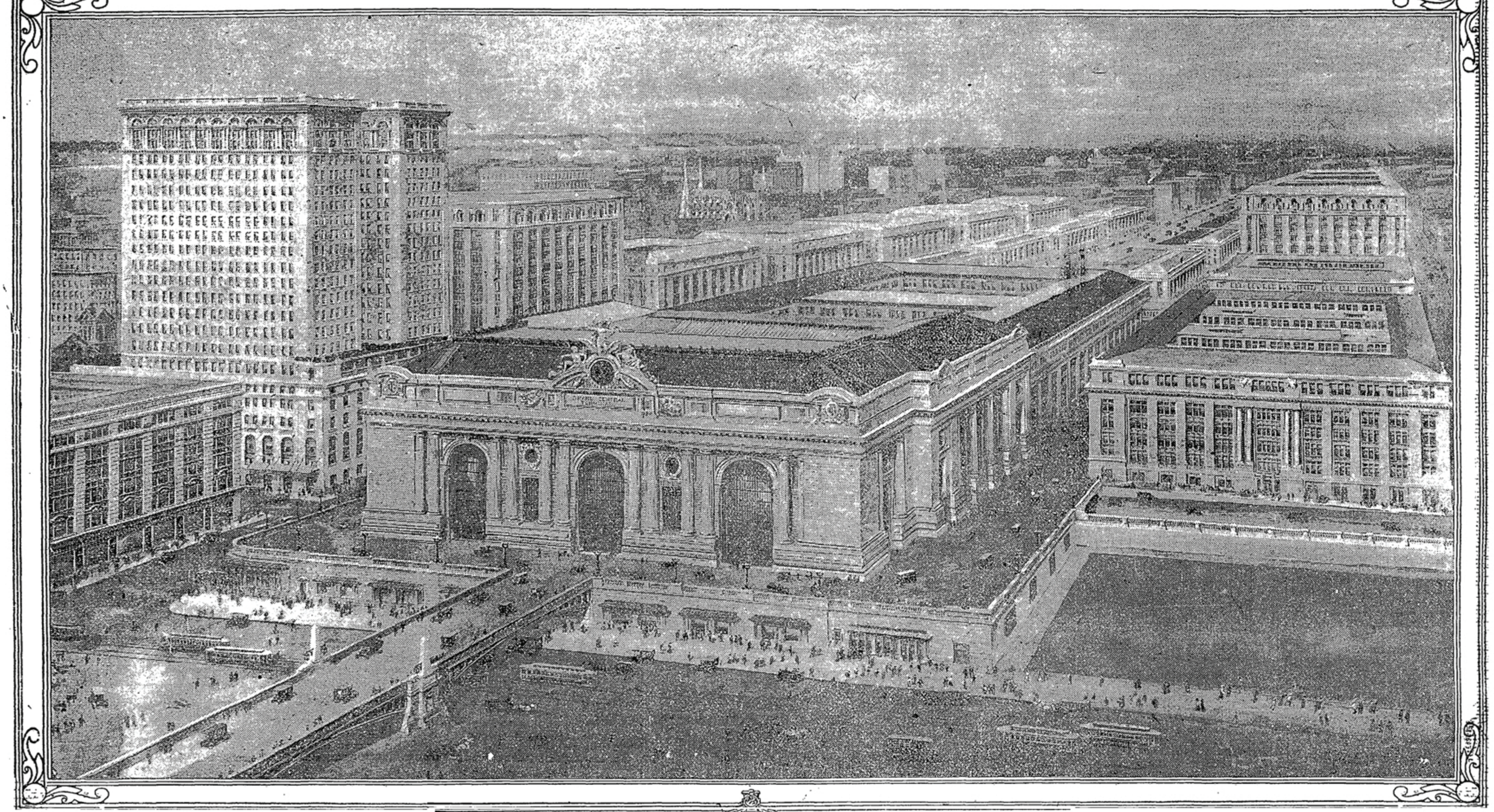
PART NINE

The New York Times.

Grand Central Terminal

SUNDAY, FEBRUARY 2, 1913.

NEW GRAND CENTRAL TERMINAL OPENS ITS DOORS



With the Surrounding Buildings It Covers an Area of Thirty City Blocks — Can Accommodate 100,000,000 People a Year.

THE new Grand Central Terminal was thrown wide to the public at midnight last night. Out of the excavation and the scaffolding, to the accompaniment of whistles and blasting and the chorus of the riveting machine, the new station has risen amid the wreckage of the old. Already the suburban concourse has been in use for several months, the finishing touches have been made on the rest of the structure and, beginning with to-day, the newest gateway to New York will be ready for the traveling public. Through that gateway in the coming twelvemonth close to 24,000,000 persons will pass on their way to and from the biggest city in the Western World. The schedule called for the dispatching of the first trainload of them at 12:25 this morning.

Many of the hurrying thousands who will pass through on this first day will see only the beauty and convenience of the world's newest railway terminal. But to those who will have heard or read of the plans, the fact about the new terminal that will seem most outstanding and most significant is that the new Grand Central is more than a gateway, more than a terminal. The terminal proper, the great head house and its accompanying buildings, are simply the heart and the cause of a group of buildings that has best been described as a "terminal city."

The old Grand Central was considered the marvel of its day, but when it became outgrown and the Directors of the New York Central and the New York, New Haven and Hartford began to consider the ways and means for building its successor they undertook a task larger than the mere replacing of the old station by a newer and larger one. They undertook to fashion anew that entire section of the city where the old station stood, to build or cause to be built thirty blocks of buildings in Manhattan, all guided by one hand that would supervise their purposes and direct the general harmony of architecture.

This was made possible by the realization that the railroad could put its "air rights" to some good purpose. For decades it had owned the land where the tracks thrust their way down to the very heart of the island and there spread out to form the huge, gaping, dirty, unsightly train-yards that helped so largely to make the idea of smoke and noise inseparable from the nineteenth century conception of a big railway station. With the coming of the electric motor the old steam locomotive was banished, and from that banishment the builders of the new terminal developed the idea of roofing over the tracks and the trains and building above them as though the road had suddenly come into possession of scores of vacant lots.

This possibility, this idea, was fraught with tremendous importance to the City of New York. Its development meant reclamation work in the busiest and most compressed part of the continent commensurate with the reclamation work carried on in the great arid stretches of the Far West. It meant the restoration to the city of streets that for years had been given over to the purposes of the railroad. Park Avenue from Forty-fifth Street to Fifty-sixth and the cross streets that formerly stopped abruptly at either side of the yawning train yards are now appearing as streets, some of them already in use.

The two levels of tracks reaching from the outskirts of the city to Forty-second Street have been depressed below the surface of the streets, great girders have been swung across to support the restored thoroughfares, and over all the buildings of the terminal city are rising one by one, a real estate development of monumental proportions. It was started ten years ago. It will not be completed for many years to come. The opening of the terminal proper simply means the opening of the most significant structure of all, the keynote building of the group. All this terminal city, this assemblage of buildings of such varied purposes, was made possible by the installation of the electric motor. The scheme could not have been carried out—it could not even have been conceived—in the day of the dirt and smoke and noise of the old steam locomotive. The rock-bottom fact of the entire enterprise is the electric motor, powerful, swift, silent and clean.

Reclamation of Millions.

This reclamation work by the New York Central is reclamation work in one of the costliest stretches of ground on the continent. Its end is the recovery of city blocks where the very land of every block is worth between $2,000,000 and $3,000,000. It is restoration of land in a part of America where, according to estimates which experts have made, the very area taken up by one of the road's Pullman cars is worth $30,000. It means the recovery and use of a great stretch of land that would cost an almost inconceivable fortune to buy.

The entire scheme involves the use of some thirty city blocks. Part of this the railroad already owned. Part of it had to be specially bought, but the idea of using the air rights reduced by an immense sum the cost of the terminal. From a business standpoint, it was just as though the space to be excavated for the tracks of the terminal were in a part of the country where land cost little or nothing instead of in one of the busiest and most intense parts of Manhattan.

It is probable that no Director of the New York Central can tell you just how much the entire terminal city will have cost when the last stone is put in place. Certainly no Director of the road is likely to tell you. But it is equally certain that the improvements will be possessed of an immense earning power that will go far toward making an adequate return on the entire investment. One of the most important and most interesting chapters in the world's history of railroading will be written when practice shows to just what extent the development of the air rights will serve to meet the overhead charges of the terminal and when it can be definitely stated to just what extent a big terminal in a big city can of itself be made a source of revenue instead of a tax upon the traffic.

As it is, the new Grand Central is just the centre of a group of buildings, some finished, some in the course of construction, some thoroughly planned, and some only dreamed of—buildings which will give over their basements to the going and coming of hundreds of trains a day.

Fourth Floor "Basements."

It is one of the most striking things about the terminal city that it will be an array of buildings without any real basements—without any basements that are really at the base of the buildings. In the buildings already completed, the Grand Central Palace, for instance, or the huge office building that accommodates the executive business of the road and the terminal, the "basements" are on the fourth floor. They call these quarters "basements" because they are dedicated to purposes usually fulfilled by basements. They have storage rooms, and they accommodate the big pipes from which radiate the myriad pipes to heat the rooms.

For all the buildings of the Grand Central group will be heated from one power and heating plant, the one already erected at Fiftieth Street, between Park and Lexington Avenues. Having no basements of their own, the buildings of the group, both present and prospective, will have to depend on the machinery housed at Fiftieth Street. This already sends the hot water down to the head house, to the general office, the Post Office, and so on, and some of it travels more than a mile before it returns to the heating plant at Fiftieth Street.

From the roof of that plant two huge smokestacks rise to a towering height. These smokestacks are interesting, for they are the only ones in the whole thirty blocks. And when the thirty blocks have all been "improved" they will remain the solitary smokestacks of that part of New York. Even they are equipped with the last word in smoke consumers, so that, even when it is a completed and thriving area, the terminal city will be smokeless. That is one element in the promised beauty.

Park Avenue, restored from Forty-fifth Street north as a great double thoroughfare, is another, and, for the buildings themselves, it is simply promised that in cornice lines and general style they will be made to conform to the one stately architectural plan. Harmony, then, is another element in the promised beauty of the terminal city.

Of the thirty blocks, some fourteen are already built on or definitely allotted. The remaining sixteen are yet to be allotted. The terminal itself, with the offices over the baggage quarters, the extra office building, the Grand Central Palace, with its auditorium, the power and heating plant, the Adams Express Building and the Post Office are completed. The Biltmore Hotel and the incoming station, another hotel, and a Y. M. C. A. are definitely decided upon. It is highly probable that the new homes of the Yale Club and the Racquet Club will be placed within the terminal group.

Some Dreams Realized.

There are other building enterprises that have been spoken of, but which to-day are little more than dreams. dreams that the architects dreamed when they found themselves facing an opportunity so unusual in the history of city building. They found themselves working with big spaces in the heart of a metropolis. They realized that only within the area of the terminal city could a space of 400 feet by 400 feet of commercial ground easily be put to the use of some big artistic enterprise. Only in the jealously guarded parks of Manhattan could the National Academy of Design find another spot so suited to its purpose or the Directors of the Metropolitan Opera House find space at once so ample and so accessible for a new home. The possibility was immediately presented then, of having Park Avenue open into a great plaza with a stately new opera house set in the centre, rivaling the beauty of the Place de l'Opera in Paris. The idea of placing the Metropolitan in the terminal group is an architect's dream. At present it is nothing more. So there has been talk of placing the National Academy there and other similar buildings, but they are dreams only. The future may see them there, and it may not.

But the Biltmore Hotel is far more than a dream. It is a definitely planned hotel that will tower twenty-three stories into the air, just to the west of the terminal. In some ways the Biltmore will be just a little different from any other in the long list of New York hosteiries. It will owe its distinction to its being part and parcel of the terminal itself, for the Biltmore is to rise above the incoming station. It will open into that yet unbuilt part of the Grand Central.

The passenger arriving at the terminal from somewhere beyond the limits of New York will be able to walk directly to the elevators that will lift him to the lobby of the Biltmore. He will be able to go directly from his seat in the Pullman to his room in the hotel, not only without having stepped from under cover, but without once having passed beyond what will really be one structure.

This notion of a hotel built in connection with a terminal provides endless diversion for the idle fancy. It has already been pointed out that when the Biltmore is a thing accomplished, your business man from Chicago will be able to come to New York, stop here over night, attend to his business down in Wall Street, and return to State Street and Michigan Avenue without once having come out into the open. This will be the easiest thing in the world when he can go directly from the train to his rooms—his baggage may get there ahead of him and without having been rechecked at that—dine in the big dining hall, revel in a Turkish bath and spacious plunge there that night, travel on down to one of those big office buildings that have Subway connections in their basements, wind up his business, and return by the Subway to his hotel, to his train, and to Chicago without ever having put his head out of doors in New York. Incidentally he will be able to do any little shopping that is on his mind, for there will be a lot of specialty shops beneath the Biltmore. The aforesaid twenty-three stories reach into the air. There are five other stories that plunge into the ground.

Another feature of the Biltmore that will serve to distinguish it somewhat from many of its competitors on this island will be its roof. The grand ballroom and dining hall of the Biltmore is to be on the twenty-third floor. It is to be so built that when the warm evenings come the windows can be taken out and the whole area converted into a roof garden of roof gardens. From a table there, milord and his lady can look out to the dark stretch of Central Park to the north, and to the south the Metropolitan tower and far away the tip of the Woolworth Building; to the west the Times Building, and beyond the Hudson and the Jersey shore, and to the east the East River and Long Island.

Gustav Baumann, long identified with the Holland House, is to preside over the destinies of the Biltmore. It is to be a hostelry of the "de luxe" sort, and the Directors of the road hope to see it regarded as one of the finest hotels in all the world.

Big Popular Hotel Also.

A hotel of another type, a thoroughly modern commercial hotel with rooms numbering possibly up to 2,000 and any of them to be had on moderate terms, is planned for another part of the terminal group. It is probable that this will be built directly to the east of the headhouse at Forty-second Street and Lexington Avenue, where the hospital stands now. The only reason why the plans are not more definite is because the subway plans have not been more definite. When it is finally established just where the line of the Lexington Avenue Subway is to be, then the work of building the big commercial hotel will be started.

These, at least, are some of the buildings which will go to make up the terminal city of which the new Grand Central itself is now to be a thing of daily use to thousands of persons.

Some notion of the magnitude of the new Grand Central may be gathered from a comparison of its proportions with those of some of the world's great railway stations. These figures are The Scientific American's:

	Total Area. Acres.	Track Length. Miles.	No. of Tr'ks.	No. of Plat-f'ms.
New Grand Central Terminal	70.0	31.8	46	30
Pennsylvania Station	28.0	16.0	21	11
Chicago & Northwestern, Chicago.	8.0	2.7	16	8
St. Louis Union Station	10.0	5.4	32	16
Boston, South Station	9.2	15.0	32	19
Washington, Union Station	13.0		29	13

Cologne	5.8	3.4	14	6
London, Waterloo Station	8.75	....	19	....
Dresden, Main Station	7.0	3.0	14	6
Paris, St. Lazare	11.2	3.5	31	14
Frankfort, Main Station	11.0	....	18	....

The number of tracks in the new terminal is here given as 46. There are really 68, but only the 46 have platforms.

One of the things that will always be remembered about the new Grand Central is that it was built amid the wreckage of the old. The never-ending business of the terminal had to go on uninterrupted. The very depression of the tracks beneath the level of the city streets involved a huge amount of labor. It meant the excavation of 6,800,000 cubic yards, about 2,000,000 of them solid rock. The earth and stone dug and blasted there in the train yard had to be carted away in dirt cars, which added a long string to the already heavy and complicated traffic of the terminal. This work is not yet done.

So in the wrecking of the station itself the work had to proceed while hundreds of thousands passed to and from the trains every week. This involved an immense amount of temporary building, temporary train sheds, temporary walks, temporary trestles. This extra cost alone was in the neighborhood of $2,000,000.

Besides being costly, it was extremely difficult and intricate work. The builders of the new station sat behind the big work as at some chessboard where buildings were castles and pawns were trains. Now shifting here and substituting there, now tearing down, now building up, the new terminal has grown out of the unsightly débris of its predecessor, and grown without seriously interfering with the traveling public.

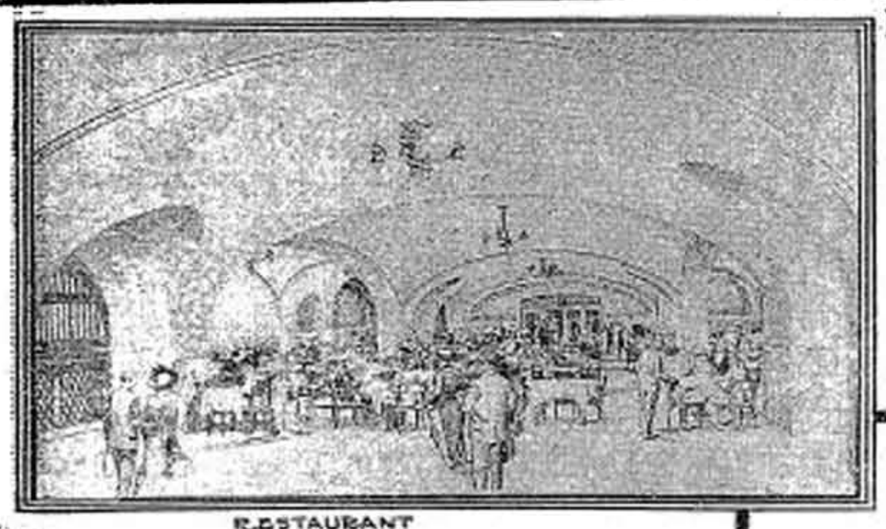
Just what this meant could be seen when the New York Central announced with no small pride that during the eight days from Aug. 30 to Sept. 6, 1912, the number of persons passing through the terminal was 344,000. This was the Labor Day traffic. There were 4,826 trains handled during this same period, with an average delay of but twenty-one seconds a train, which is pretty nearly perfect operation.

The removal of the old train shed alone was one of the most difficult and daring things in the history of building. It was 600 feet long and had a 200-foot span, a huge thing of steel and iron and brick and glass. It was torn down, but the traffic beneath was not halted for so much as an hour. In the busy hours of the day an enormous moving traveler, sliding along rails built on high platforms, attended to the work of demolishing the old shed, section by section. In the slack hours of the night the débris was lowered to the worktrains and hauled out of sight and out of mind.

Some notion of the scope of this single task may be gathered from the fact that it meant the removal of 1,350 tons of wrought iron, 350 tons of cast iron, 90,000 square feet of corrugated iron, and 60,000 square feet of glass. The traffic was not only not halted during all this wrecking, but not an accident occurred to mar the story of it. Altogether the building of the new Grand Central Terminal was no easy task.

SOLVING GREATEST TERMINAL PROBLEM OF THE AGE

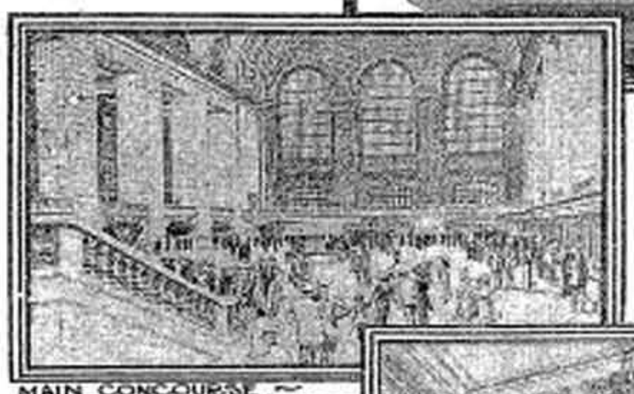
Looking Ahead to Possible Traffic Development, the New Structure Has a Passenger Capacity Equal to Any Conceivable Emergency.



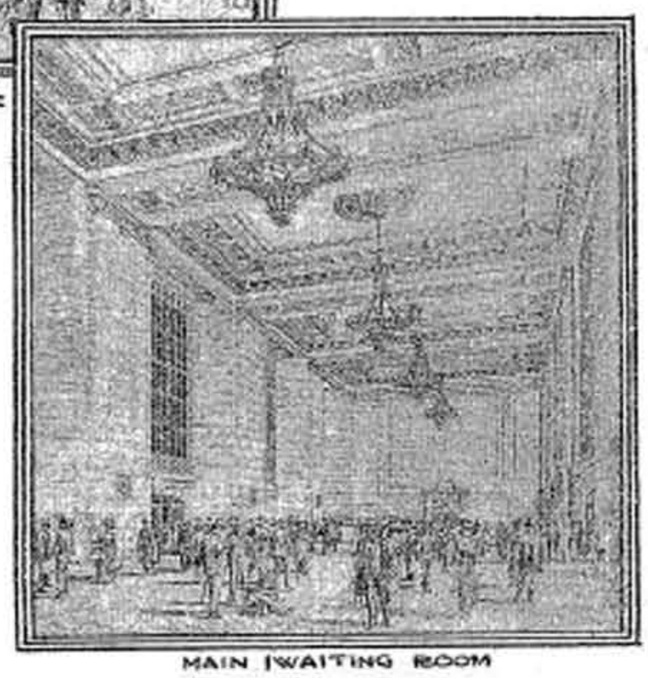
RESTAURANT

LADIES WAITING ROOM

ORNAMENTAL GROUP TO SURMOUNT 42 ST. FACADE



MAIN CONCOURSE
300 FT. LONG, 120 FT. WIDE
125 FT. HIGH



MAIN WAITING ROOM

IN view of the many changes that the New York Central's termina. has undergone in the course of its history, people are asking, quite naturally, whether the great railroad station that is open to-day for the first time is the final, permanent structure, adequate to accommodate whatever future development may come to the great system of traffic to which it belongs. In answer to this pertinent query the following facts will be of interest.

The new terminal was built to last for many years. This does not refer to the granite and limestone of its exterior, but to its capacity to handle the millions who will use it every year. It is a fairly easy guess to fix upon twenty-four as the number of millions who will pass through this gateway before Feb. 2, 1914. It is not so easy to say what the traffic will be in 1918 and 1920, so startling are the leaps and bounds by which New York advances in numerical strength and significance. What will it be in 1930 and in 1940? That was the question which the builders of the new terminal asked themselves as they confronted their problem. They say to-day that they have completed the essential structures of a station that will easily accommodate 100,000,000 in a year. That boast means simply this—that through this new gateway to New York the entire population of the United States could pass in a single year without crowding and without confusion.

The Station Problem.

The preparation for the handling some day of a traffic so enormous meant two converging lines of effort. The new station had to be large enough. It also had to be convenient enough. It had to be roomy, but mere roominess would not serve the purpose. In a sense, the very size of the terminal threatened to be a drawback. It must not be too large or seem too large for easy use. The architects set before themselves the problem of planning a station that would be as compact as the little station of a little town. In a sense, then, the new Grand Central Terminal was planned to be one of the "smallest" big stations in the world.

To put it in another way, the builders of the terminal expended every energy in their effort to make it a thing of convenience as well as of size and of beauty. They foresaw that they simply had to eliminate, as far as it was humanly possible, the old conflicts and friction of the old railway stations. They foresaw that it would be preposterous to expend scores of millions in an enterprise that would prove cumbersome in the using.

One of the most conspicuous features of the terminal plans was the obvious effort to systematize every activity with which henceforth it will be astir. Everything is segregated. When the thing is all done there will be a separate and distinct station for the incoming and outgoing passengers. These stations will be all part of one structure, of course, and it will be the simplest thing in the world to get from one to the other. But they will be distinct. The incoming folk will not meet the outgoing. More important than that, they will not run into one another.

In the elimination of many of the countless little conflicts and confusions, once considered the inevitable drawbacks of a big terminal, some very simple ideas have been carried out and installed.

Most striking to the casual student, some very ingenious devices have been installed for the proper handling of the express and the suburban traffic. The first level beneath the surface of the city streets is given over to the people using the express trains. On this level the passenger will find the main waiting room and the grand express concourse. The second level accommodates commuters innumerable and all the persons going to and from the suburban trains. Here is the suburban concourse, now in use, and the restaurant.

It has even been said of the great waiting room that it will prove an essential part of the systematization idea. It has been designed as a place to wait, just that and nothing more. The new Pennsylvania station has already taught the comfort of that kind of waiting room, where all the old hubbub of ticket buying, information seeking, parcel checking, and relative meeting made anything like restful waiting a painful if not an impossible thing.

The "Kissing Galleries."

As the last word in segregation, consider the announcement that even sentiment is to be segregated in the new Grand Central Terminal. There are specially designed parts of the station known as the "Kissing Galleries." They are the places where you may go to meet the person you want to meet. These galleries run alongside the inclined walks on which the stream of passengers from a train just arrived make their way to the street. Slightly elevated, it is promised that they will offer exceptional vantage points for recognition, hailing, and the subsequent embrace. Time was when the embracing went on all over the terminal, and the indignant handlers of the baggage trucks would swear that their paths were forever being blocked by leisurely demonstrations of affection. But we have changed all that.

One of the great simplifications that have been carried out for the new terminal are the ramps, which is the official and proper name for the inclined walks leading from the street to the trains. It is one of the most interesting things about the building that to all intents and purposes it is stairless. Even that painful, annoying, and dangerous step at the train itself is gone, for the car platforms and the station platforms are built flush.

up and down them and report the degree of approval or disapproval. Fat men and thin men, women with long skirts, women with their arms full of bundles—all these tried the ramps and announced their impressions. The final degree of inclination decided upon was

The problem of the footways for a terminal to be built underground was not one of the least of those that confronted the builders. The infinite pains taken in this respect is used as an illustration of the care taken in every detail. When it was decided that inclined walks should serve as the footways leading into the huge subterranean station, the idea was borrowed from the sloping roads that led the way for the chariots into the old Roman camps of Julius Caesar's army—no pains were spared to arrive at just the proper angle of inclination. To determine this, ramps of every possible angle were installed and the effect on the unconscious public was watched and noted with care. Experimental slopes were built and every variety of person was induced to trudge eight in every 100 feet, and these slopes are said to be so gentle that if a child can toddle at all it can toddle comfortably from a train to Forty-second Street.

This same elaborate study of the convenience of the hurried passengers has entered into the preparation of many other features of the new station. To the end that the paving material used should be just the best possible for the purpose, every feasible variety was put down for experimental purposes in that much traveled footway leading from Forty-second Street to the temporary station. Then the experts sat by and studied the effect of the people on the pavement and the pavement on the people. By this means, unconsciously the hurrying millions contributed to the shaping of the new gateway to New York. In this wise, the station builders learned just what size and what shape letters to use over the train gates, and just how best to throw the light on those letters. Millions of eyes and every variety of deficient sight had their weight in deciding these questions—questions that seem so small and unimportant to the casual traveler, but which loom large when it is considered with what unbelievable care the details were studied. But that is what it means to build a great terminal with the twentieth century idea of efficiency checking every step.

There is the promise of innumerable smaller conveniences, everything from attendant physicians and barber shops carried to an effete perfection to special dressing rooms for the suburbanite who wishes to attend some evening dress function in the city without the time and trouble of going home and without the trouble and expense of taking a room at the hotel. The evening dress can be left in the dressing room at the station when the suburbanite comes into town in the morning, and there he can shift his workaday togs when the evening hour with its festivities is at hand.

The Room of Rooms.

The room of rooms in the new Grand Central is the outbound express concourse, a giant room of which the very dimensions are impressive—301 feet long, 125 feet wide, and 125 feet high. Its walls are finished in Botticino marble and buff-tinted stone, and now that all the unsightly scaffolding is stripped away and the light falls softly through the great millioned windows there is something more of warmth and comfort than of austerity in the great concourse. You enter this concourse by the sloping walk from the waiting room or down the steps from the covered causeway where the cabs swing in from Forty-second Street. In it are the ticket offices, the baggage checking booths, the information bureaus, and the like, all arranged in a logical sequence so that the logical passenger need not retrace his steps.

Another innovation in the new terminal that will prove of great significance is the loop system of tracks. It was planned trains on the seventy-nine acres of tracks should approach, give forth their passengers, move on around the loop, halt to deposit their baggage, and then sweep on out of the terminal. The old incalculable loss of time from backing and shifting will be gone with this new system introduced, and just as the incoming and outgoing folk have been separated, and the express traffic divided from the local, so the old confusion of baggage and traveler will be abolished. It will all save time and eliminate friction, and it means a fortune to the New York Central to have time saved and friction eliminated in its new home.

Other little devices promised are the continuation of the megaphonic announcers to a paging service, so that a person believed to be in the terminal and wanted in a hurry will be startled, perhaps, to hear his name called forth from the walls with the information that a man or a message or a telephone awaits him at such and such a place. The familiar blackboard with its chalked announcements of train arrivals will be replaced in time by an illuminated board with movable letters controlled from a tower in the yard. The setting of the switches for the arrival of a train on a certain track will be the signal for the flashing of the announcement. This will save a few seconds, and they are taking care of the seconds in the newest of terminals.

The grand concourse floor of the terminal is on a level with the mezzanine or ticket-window floor of the subway. This distinction was accorded the concourse because it was found, by counting, that about 80 per cent. of the passengers coming to and leaving the terminal did so by way of the Interborough.

Part of the complete terminal will be a great joint subterranean station for the converging lines of the city's underground transit. It will be shared by the present subway, the extended McAdoo tubes, the Steinway tunnel and the Lexington Avenue subway. All these and the surface and elevated lines will pour an unending stream of traffic into the waiting terminal, making it, perhaps, the most active spot the world has ever known.

Many of those who have examined the Grand Central pictures as they have been drawn architecturally and published off and on during the last two years may wonder, when they journey over to that part of Forty-second Street, as to the whereabouts of that overhead street, which, in the cut accompanying this text, shows as a light and graceful bridge thrust from the very centre of the terminal's main façade to the higher level of Park Avenue at Fortieth Street, just over the arch of the Park Avenue tunnel. The street is not yet built, but it will be. Its building is up to the city, and the symmetry of the arrangement will not be interfered with by the unsightly projection of the Third Avenue "L" which extends along Forty-second Street. Some way will be found to have that down.

Once in place, this overhead street will be admirable, for it is designed to do a large part in alleviating the street congestion and confusion at the doors of the terminal. The bridge will form the direct route for the approach to the station by carriages and automobiles. At its north end it gives on a gallerylike roadway that completely surrounds the head house and reaches each of its many carriage entrances, as well as the cab stands and baggage rooms just beyond. Besides lifting the vehicular burden from Forty-second Street this bridge furnishes the southern approach to that sumptuous boulevard which is being elaborated on the other side of the terminal and from there stretches due north as the main artery of the "terminal city."

NEW TERMINAL THE HEART OF CITY'S TRANSIT SYSTEM

GRAND CENTRAL STATION as the main entrance to New York City is naturally a most important point in the local rapid transit system. The present Interborough Subway was laid out to pass its doors, the new Lexington Avenue Subway will come down its eastern side, and the McAdoo Tubes are to be carried up Sixth Avenue and under Forty-second Street to bring passengers from New Jersey to the great terminus. These lines were designed to reach the Grand Central Station because of its existence, but to them must be added the very important Steinway Tunnel line, which will run across town to Times Square and was built from the end of Forty-second Street more fortuitously.

So it will happen that, wonderful as is the new Grand Central Station, from the engineering point of view, the complex of subways just outside of it will be equally worthy of attention. The solid rock on which this part of Manhattan is built will in the next three or four years be absolutely honeycombed with rapid transit lines, and the ingenuity of the engineers will be taxed to the uttermost to arrange the lines with the greatest convenience to the public and the utmost regard for operating difficulties.

Though the Public Service Commission has not yet made the final studies which will determine the position of the new lines, a few factors in the case are fairly well settled. The engineers look upon all the ground below grade as divided into three levels, and every underground line must be assigned to one of these.

At the present time the Interborough Subway has been built on the first level just below the surface of the street. This will, of course, remain where it has been built. In the same way the Lexington Avenue Subway will occupy the first level along that thoroughfare. Then the Steinway Tunnel, which already has been constructed westward to a point between Third and Lexington Avenues, by reason of the necessity of getting beneath the bed of the East River, is on the third level, and will naturally be carried further on at the same depth. This leaves the second level to the McAdoo tubes.

It is anticipated that the present Subway between Times Square and Grand Central Station under Forty-second Street will be reduced to the grade of a mere shuttle line. When the dual system is in working order there will be two great north and south subway lines, one on the east and one on the west side of the city. There will be comparatively little traffic across town, and though the physical connection between the Forty-second Street line will be maintained with both the west side and the east side lines, so that in case of emergency the Interborough may be able to operate trains along the routes they follow at present, during the greater part of the time the piece of track, now perhaps the most traveled of all in the city, will be left to a simple shuttle service.

This will be convenient enough, if the Public Service Commission decides to adopt the plan urged on them by the Broadway Association and the Times Square Association for the construction in Times Square of a great concourse, where the crowds who will naturally flock to the great west side traffic centre may be distributed easily and safely under cover. Moreover, it will provide for the use of two of the present tracks for the end of the Steinway Tunnel line. This, it is suggested, will be slowly raised from the third to the first grade at Fifth Avenue and will ultimately use the two southern tracks of the present line in which to reach its Times Square terminal. By this means, if the need arises, the trains from Queens could be switched to the northern part of the west side line.

Meanwhile, curving in from Sixth Avenue, perhaps under Bryant Park—perhaps under Forty-second Street—will come the McAdoo tubes with a station near the Public Library. The B. R. T. proposes to make use of this road, when it is built, for the accommodation of its patrons. It has been announced that a tentative agreement has been reached by which passengers from Brooklyn, who have come up the new Broadway line, will transfer at Herald Square to the McAdoo line. They will thus be carried to the Grand Central Station from any part of Brooklyn with, in many cases, only a single change of cars, for a single five-cent fare.

Then the Lexington Avenue line, which is now in course of construction for the Interborough, will connect with the present Subway close by Grand Central. The plans for this have not yet been worked out, but, in a general way, it is understood that the Public Service Commission is in negotiation with the New York Central Railroad Company for the construction of a great sub-grade concourse underneath the site of the old Hospital for Crippled Children, at the corner of Forty-second Street and Lexington Avenue, which is the property of the company. From this there would be direct access to the Grand Central Station in exactly the same way as there will be direct access from the present Subway station.

The McAdoo tubes will have a double part to play. Not only will they give direct connection with all the termini of the New Jersey railroads, except the West Shore, and through Newark far into the hinterland of New Jersey, but they will also, by the transfer arrangement at Herald Square, give access to all the great B. R. T. system. By a change of cars at this point passengers arriving at the Grand Central will reach the Broadway line, and, by the Manhattan Bridge, or the Whitehall Street tunnel, will find themselves on any of the great network of Brooklyn elevated roads, which run to Coney Island, Canarsie, Brighton Beach, Jamaica, and so on. Moreover, they may connect with the Long Island Railroad at Atlantic Avenue. So it follows that a resident of Montauk Point or Greenport, after getting into the Long Island train at his own station, may travel to any point on the American continent, reached by trains from the Grand Central Station without ever going out into the open air.

The tentative plan drawn by the Public Service Commission is set forth in a remarkable drawing of what a cross-section of Manhattan Island just south of the Grand Central Station will look like when all the rapid transit lines are constructed. It is seen from this that there will actually be seven levels for traffic at the junction of Forty-second Street and Park Avenue.

The lowest of all will be that of the Steinway Tunnel, which will have immediately above it a mezzanine floor. Access to this will be obtained either by a stairway or by an elevator, which will run straight down from the great concourse of the subway system, which will be to all intents and purposes merely an extension of the concourse of the Grand Central Station itself. Then, above the Steinway Tunnel's mezzanine, will come the level consecrated to the McAdoo tubes. The trains from New Jersey, according to the rough idea at present entertained, will run in on two tracks, each of which will come to a dead end. A cross-over just outside the station will allow the trains to reach any track.

Above the McAdoo level will be the stratum on which both the present subway and the new Lexington Avenue trains will run. It is proposed to bring the Lexington Avenue Line into Park Avenue by a curve under the site of the old hospital and the Grand Union Hotel, with the station stretching from Forty-third to Forty-first Street.

Thus the two subways will meet at an angle a block or so south of Forty-second Street, and there will be plenty of space between them as they approach, to construct a large exchange station for passengers who wish to transfer from the Lexington Avenue across town by the shuttle service to the west side line at Times Square. They will only have to cross the platform without ascending or descending any steps.

From this the ascent to the street will of course be easy, and it is the street which forms the sixth level from the bottom of the series. A seventh will be supplied by the bridge to be thrown across Forty-second Street from the new Grand Central, in order to provide easy and safe communication with the summit of Murray Hill in Park Avenue.

FACADE OF THE TERMINAL THE KEYNOTE TO THE STRUCTURE

ALTHOUGH one minute after midnight on this, the morning of Feb. 2, was long ago set as the time for the opening of the new terminal, this has meant simply that by to-day the huge station would be ready for use. To-day the vast concourses and waiting rooms would be ready for the traveling public. It has not meant that by to-day the final touches would have been put upon the entire structure. The business of perfecting it will be in progress all this year and next year and beyond.

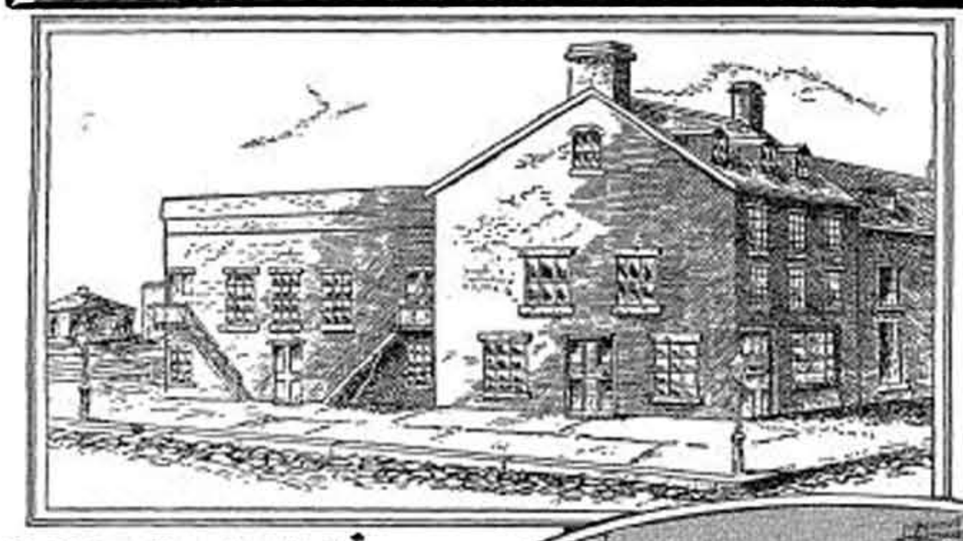
One important part of the exterior will not be in place for months to come. That is the sculptured group which is to stand, forty feet in width, above the central portal of the Forty-second Street façade and will, in the words of the Grand Central's own literature of the new terminal, represent "Progress, Mental and Physical Force." It is to embrace the clock. Now that the scaffolding and all the rubbish of construction have been stripped away, the superb front of the building can be viewed from far down Park Avenue, a thing of serene beauty. But the work of the sculptor that is to crown it all is yet to be done. This group will be carved in stone upon the building itself, and the countless thousands who hurry past and around and across that point will watch it emerge in gradual beauty and significance. But the working model from which the group is to be fashioned is still in the Paris atelier of Jules Coutant, the sculptor who won the commission of designing it.

One model in plaster rests over the fireplace in the office of Whitney Warren, of Whitney & Warren, the architects of the terminal. Mr. Warren has written a brief interpretation of the group's significance and of the entire façade motive. In The Scientific American, under the title "Apologia," Mr. Warren wrote:

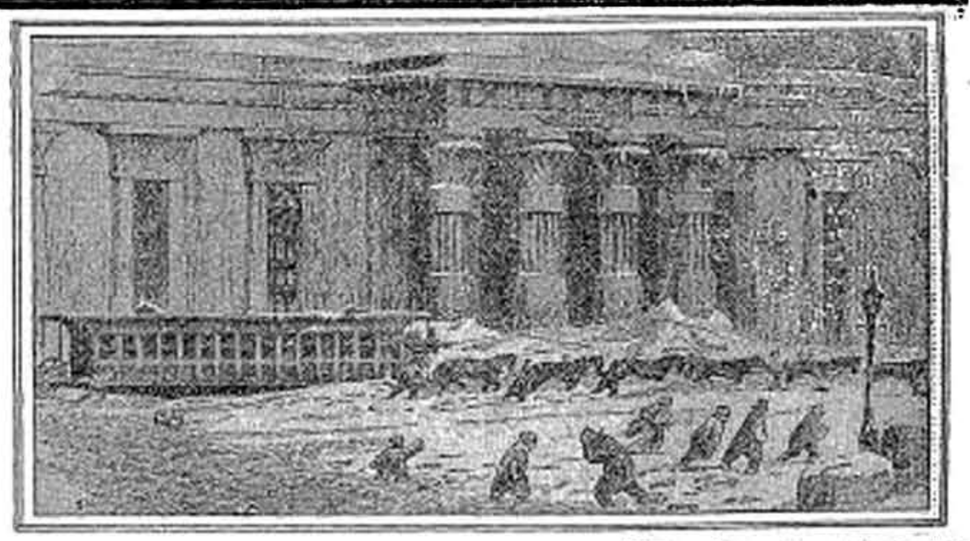
> Architecture being a reasoned art, for any specified purpose there should be precedent and tradition—every motive and element should have its reason for being, and in all compositions, no matter how simple, the elements must explain themselves and justify their presence. In ancient times, the entrance to the city was through an opening in the walls or fortifications. This portal was usually decorated and elaborated into an Arch of Triumph, erected to some military or naval victory, or to the glory of some great personage. The city of to-day has no wall surrounding that may serve, by elaboration, as a pretext to such glorification, but none the less the gateway must exist, and in the case of New York and other cities it is through a tunnel which discharges the human flow in the very centre of the town.
>
> Such is the Grand Central Terminal, and the motive of its façade is an attempt to offer a tribute to the glory of commerce as exemplified by that institution. The architectural composition consists of three great portals, crowned by a sculptural group, the whole to stand as a monument to the glory of commerce as typified by Mercury, supported by moral and mental energy—Hercules and Minerva. All to attest that this great enterprise has grown and exists, not merely from the wealth expended, nor by the revenue derived, but by the brain and brawn constantly concentrated upon its development for nearly a century.

CITY'S GROWTH EPITOMIZED IN TERMINAL CHANGES

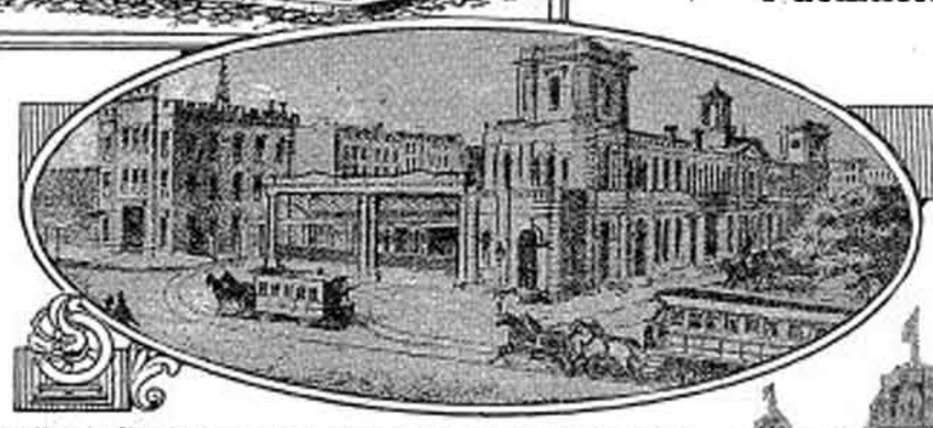
In Eighty-One Years of Its History the Central Has Built Five Stations in Its Efforts to Supply New York's Evergrowing Population With Adequate Transit Facilities.



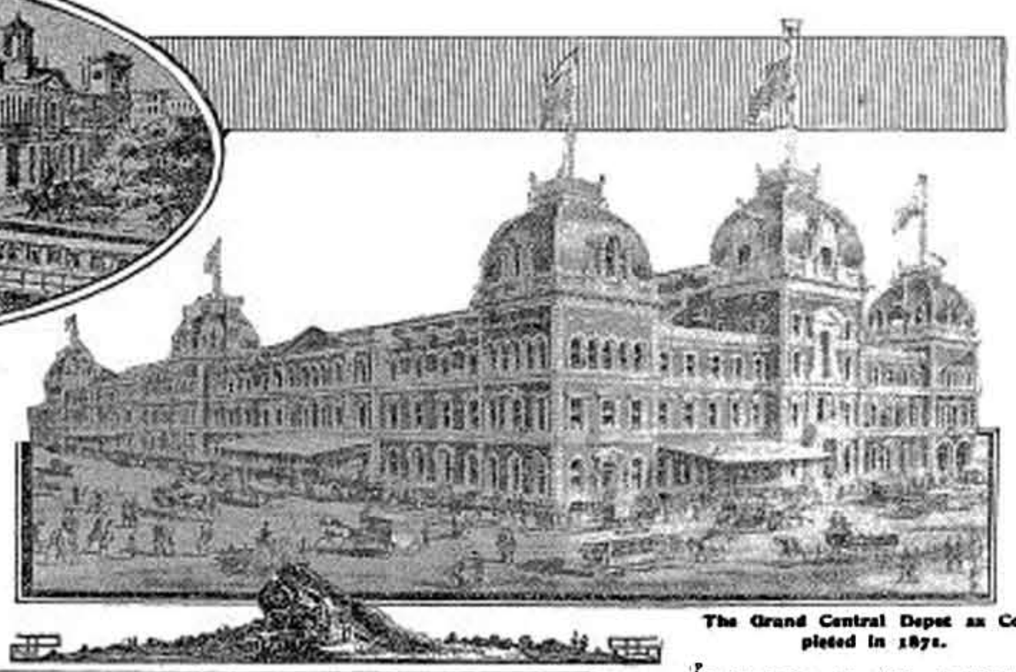
Old Office on Tyron Row—Fourth Avenue Railway.



Pulling Cars from Twenty-sixth Street and Madison Avenue to Terminal Near City Hall.



Terminal at Fourth Avenue and Twenty-sixth Street, Built in 1837.



The Grand Central Depot as Completed in 1872.

The Predecessor of the Present New Terminal.

Perhaps nothing gives so clear a bird's-eye view of the tremendous growth of this city as does a glance backward over the eighty-one years that cover the history of the New York Central on Manhattan Island.

Here is just one quick glimpse that vividly shows the almost magical growth of the city's population and of its ever-increasing demand for greater transportation facilities:

In the late fifties, when the tide of population and traffic moved uptown, a new station was built at Twenty-sixth Street, on the present site of the Madison Square Garden. It was erected by the New York & Harlem Railroad, now a leased line of the New York Central, and shared by the New Haven road as a tenant. This structure was one of the sights of old New York; the city was justly proud of its spacious new terminal. Yet that station of fifty years ago could be set down in the express concourse of the new terminal in Forty-second Street without touching the side walls or reaching the roof.

But let us start at the beginning.

The New York & Harlem Railroad was the earliest on Manhattan Island. It was built in 1832, and its terminal was on Centre Street, just back of the City Hall. At that time, however, the terminal was no more than the mere ending of the tracks, just as certain of the surface cars end their runs there to-day.

This railroad was partially operated through two tunnels. The first of these cut through the crest of Murray Hill from Thirty-fourth to Forty-first Street. The second was the so-called "rock tunnel," extending from Eighty-sixth Street to about 100th Street. From it the railroad descended over a timber trestle—about which timid folks were always nervous—to the Harlem plain.

It was soon decided that a station was a proper part of a terminal's equipment, and so a little later we find the New York & Harlem Railroad building a station at White and Centre Streets, the present site of the Criminal Court Building.

The city north of the new station soon began to solidify, the streets became filled with traffic, and the increasing number of passengers necessitated longer trains. When the trains grew to the unprecedented length of five cars, only the first three cars rounded the sharp curve at Broome Street and continued on to White Street. The other two were cut off where the rails left the Bowery.

This expedient met conditions for a very short time. The city continued to grow, the Bowery began to be a real city street, and the people objected to locomotives running on it.

To meet this difficulty the management planned New York's first "uptown" railroad terminal. In 1857 the New York & Harlem Railroad station was completed at Fourth Avenue and Twenty-sixth Street, where the Madison Square Garden now stands, then the "outskirts" of the Nation's metropolis.

Yes, New York was growing, and undoubtedly it would continue to grow. The new station at Twenty-sixth Street was constructed with an eye on the future growth of the city.

It was used by the New York & Harlem Railroad and the newer railroad to New Haven, which used the former's tracks south of Woodlawn. Harlem trains swung out from one side of the station, New Haven trains from the other.

Its capacity caused New Yorkers to swell out with a vast amount of civic pride. They told out-of-town people, with much satisfaction, that 8,000 persons came in and went out by way of it every day. There were thirty trains each way a day.

A copy of an old time table on the Harlem Road is given on this page.

After the completion of this great terminal no locomotives were sent south of Twenty-sixth Street. Horses were used to draw the cars through the pleasant suburban streets to the heart of the city. A few stops were made at the busiest cross streets, such as Twenty-third Street, Fourteenth Street, and Canal Street.

Soon there was more trouble for the railroad: people began to object to the locomotives running through Fourth Avenue to Twenty-sixth Street, though the tracks lay through the Fourth Avenue tunnel from Forty-first Street to Thirty-fourth Street, now used by the trolley cars. The agitation became so strong that the railroad had to buy a big open lot at Forty-second Street for its engine houses and send the cars south from that point drawn by horses.

It was a few years after this that Commodore Vanderbilt began to play his part in the railroad affairs of the Nation. But before this is recounted let us glance at New York as it was in the middle of the last century.

On the east side of the city, Yorkville and Harlem were villages clustered about Eighty-sixth Street and 125th Street, the former being reached by the Third Avenue surface railway, and the latter by the same road, and the line of boats which started from Peck's Slip. The Harlem Railroad also stopped at Eighty-sixth Street, 110th Street, and 125th Street.

The west side of the city was practically unsettled. Above Fifty-ninth Street, west of Central Park, there was only one row of stone houses—on Ninety-second Street, east of Columbus Avenue—and the Boulevard stages and the Eighth Avenue surface cars took care of all the traffic between Broadway and Central Park, and the Hudson River Railroad, with its stations along the river front at Manhattanville, Carmansville, Inwood, and Fort Washington, took care of the rest of the inhabitants of that section.

The Hudson River Railroad was an independent line at that time that clung closely to the west side of the town. When it was first put in operation—not so many years before the time of which we are speaking—the cars were sent out from a little covered shed at the southwest corner of Chambers Street and West Broadway.

Then folks began to object to the locomotives going through the streets, and cars were drawn by horses to the yard at Thirtieth Street, where they were made into trains and the road engines attached. This was found to be unsatisfactory. Before the close of the civil war all passenger trains were being received and sent from Thirtieth Street. It is interesting to note here that it was at this station that Abraham Lincoln was received when passing through New York on his way to Washington for the inauguration in 1861.

And now to come to Commodore Vanderbilt. Late in the year 1862 this great railroad organizer set about buying the stock of the New York & Harlem Railroad. He is said to have bought much of it at $9 a share. In less than a year the stock was being quoted at $50 a share.

What had caused this big jump?

Rumors were in the air, and within less than a twelvemonth they were justified. By 1864 Vanderbilt loomed up as the owner of a controlling amount of stock in the New York & Hudson River Railroad.

With these two railroads in his control, Vanderbilt began the process of "assimilating" a third—the New York Central. This was a union of ten little railroads, some running in the territory between Albany and Buffalo, others merely projected.

With these three railroads under one control all that was needed was a short line from the Harlem tracks across to Spuyten Duyvil and a bridge across the Hudson at Albany, so that folks going West would no longer have to undergo the disagreeable ferry ride there; and the great through trunk line between New York and Buffalo was established, and took the name of the absorbed up-State road—the New York Central.

Such railroading demanded a real gateway in New York. In 1869 the plans for a new station, the terminal of the newly amalgamated lines, were completed.

There had been a great deal of discussion over the site. Commodore Vanderbilt settled the question by selecting a piece of ground on Forty-second Street. He called the new station the Grand Central because of its accessibility.

Its cornerstone was laid on Sept. 15, 1869. As the station began to take shape, New York opened its eyes and gasped. Nothing like it had ever before been seen. It had fifteen tracks in its trainshed. Some folks said that Commodore Vanderbilt was in his dotage. Others explained the great depot by saying that the Commodore was simply building a terminal that would last for all time.

The first train left the trainshed on Oct. 7, 1871. According to contemporary notices this wonderful shed covered four acres of land, had two acres of offices under its roof and required fifteen miles of steam piping to heat them. It conveniently accommodated a daily traffic of eighty-eight trains, three of them through expresses to the West. During its opening year 4,000,000 people passed through its doors.

A picturesque annex of the original Grand Central was the Commodore's fuel factory. It was next to a stable that stood where the Hotel Belmont now towers, and consisted of a treadmill operated by horses. This mill cut the wood used in the New York Central's locomotives. To keep the horses at their drudgery a wisp of hay was hung in front of each one. Now and then the men in charge of the horses would give them a nibble to keep up their spirits.

One day the Commodore stopped in at his fuel mill. The hay device interested him immensely. As he turned to leave he said to one of the men in charge:

"You'll have to see that you don't run out of hay here. If you should my railroad would go out of business!"

The completion of the Grand Central Depot, however, brought no rest for the railroad management. Within a month after it was finished there was a great public clamor.

Several cross streets passed over its approach yards at level; in fact, there were grade crossings all the way north in Fourth Avenue to Eighty-sixth Street.

The horse cars in Fifty-ninth Street used to have constant hair breadth escapes at the Fourth Avenue crossing, and that was nothing to the crossing at Forty-fifth Street, at the mouth of the trainshed. A driver who took his wagon across those fifteen busy tracks literally took his life in his hands. It was a trip of daring for foot passengers. Beyond the wooden trestle leading down to the Harlem plain there were also many grade crossings before the drawbridge at the Harlem River was reached.

The deaths at the many grade crossings were so frequent that an agitation against the road was started which was even greater than the recent agitation against "Death Avenue," on the west side.

Mass meetings were held over Harlem, Yorkville, and in the district between Forty-second and Sixty-third Streets, and the watchword was, "Sink the track and arch it over." Well-known speakers appeared at the meetings, and the agitation grew so rapidly that the whole city was up in arms.

The railroad was finally compelled to take action, but succeeded in having the city pay one-half of the expense, at which there was little complaint, so anxious were the citizens for the improvement.

By the beginning of the eighties the terminal was again in a state of congestion. The suburban business had become a sizable traffic. The station was clogged morning and night, and so the annex, which gave four additional tracks to it and provided for most of the incoming traffic, was built in 1884.

But it was not many years before complaints began to be heard again, complaints against the old waiting rooms and the general facilities for handling passengers.

As a result of these complaints, in 1900 the station was enlarged to accommodate about 60,000 passengers daily. The number of tracks was increased and three stories were added to the building. These changes cost over $2,500,000.

Yet these facilities, imposing as they seemed at the start, soon proved inadequate. There were many reasons. One was, of course, the rapid increase of population in New York and vicinity. Another, and perhaps the most important, was the immense growth of the suburban traffic. More than a million commuters come into New York every morning from points within a radius of twenty-five miles, and a considerable part of this human stream pours through the Grand Central. It must be handled quickly and without interference with the through business. The present work really began with a study of possible improvements in managing this near-by traffic.

To the congestion of traffic was the added discomfort from the use of steam engines. This was especially obnoxious and dangerous in the tunnel. Sentiment developed for the electrification of the roads using the station. In January, 1902, conditions were crystalized by an accident which occurred in the tunnel on a snowy morning, owing to the inability of a train engineer to see signals on account of the smoke from a locomotive ahead. As a result a legislative act was passed at Albany requiring the railroads, after a certain date, to operate their trains by electricity through Park Avenue.

Now that electrification was mandatory, fresh impetus was given to the plan of reconstructing the terminal. Here we reach the real keynote of the whole great project, for without electrically hauled trains the improvement could not have been developed along the broad and original lines that mark it.

Now that the great terminal has been opened, people are beginning to speculate on how long the new one will last. "No one can tell," said an old railroad man. "I hope it will last at least half a century."

MODERN TERMINAL SUPPLIES PATRONS WITH HOME COMFORTS

STATION.—A place where railroad trains regularly come to a stop for the convenience of passengers. Thus says the dictionary, and for its day and generation it spoke the exact truth that is expected of a good dictionary.

But now that the new Grand Central Terminal has been opened to the public an enlarged definition of the word "station" is needed.

The mammoth structure, facing Forty-second Street, might accurately be described as a great railroad terminal with home trimmings attached. The management has not only planned a station in which hundreds of trains daily can arrive and depart promptly, a station in which thousands and thousands of passengers can get to and from their trains with the least trouble and inconvenience, but it has planned a station in which these passengers can find, if they so wish, many of the conveniences of their more or less far-away homes.

Said an official of the railroad:

Let us begin in the women's bootblack room. Women travelers at Grand Central Terminal may step into a handsome, brightly lighted room entirely out of sight of the rubbernecks, where colored girls in neat blue liveries will polish their shoes.

Or if hair gets out of curl in a damp day's journey the woman passenger may go to the women's hairdressing parlor in Grand Central Terminal, a magnificent apartment with walls and ceilings of Carrara glass, where none but her own sex will see while she has her hair dressed in the very latest style. Next she may step into an equally sumptuous manicure parlor, or, if she is in a hurry, the manicure will attend her while the hairdresser works.

Should the woman passenger want to primp up still more, or if she should want to return after a shopping tour to change her costume for a social function, she may have her suitcase or her trunk, for that matter, sent to a private dressing room, for the use of which, with a maid in attendance, she will pay but 25 cents.

Probably no woman ever started on a journey without forgetting something. These little oversights need cause no worry to the traveler in the Grand Central Terminal. The little knicknacks she may need to complete her toilet are to be found right at hand, almost at the door of her dressing room at the same prices she pays in her favorite store, or if the hairdresser does not happen to have what she wants she has but to step across the main waiting room or send a messenger to a hall, from which opens a row of shops right in the terminal itself, where complete lines of everything that travelers can be expected to want are on sale.

After all these exertions the traveler will probably feel hungry. Only a few steps away from her dressing room is a handsomely appointed restaurant.

When she is finally ready to go the traveler may step into a taxicab, with prices under railroad regulation, that will take her anywhere in short order, or if she wants a cheaper ride she may, without once stepping into the open, descend to a subway line that will take her to any part of New York, to New Jersey, or to Long Island.

The only place on earth outside his own home that a man may have a private barber shop for his own exclusive use, with a barber in attendance at his pleasure, is at Grand Central Terminal. Many men, particularly those occupied with large affairs, like to get away from the crowd whenever possible. For this purpose they travel in private cars or in compartments or drawing rooms in sleeping cars. Now, for the first time they can have a private barber shop reserved by wire for their use upon arriving in New York at any hour of the day or night. The cost of this luxury, including the services of a barber, is $1 an hour.

Those who want a shave in luxury at lower cost may patronize the $100,000 public barber shop, with its walls and ceilings of Carrara glass. Here the customer may elect to be shaved in any one of thirty languages. Since travelers from all the nations of the earth pass through Grand Central terminal, the management has provided the most extraordinary array of linguistic talent ever assembled in one business in order that no traveler may need to resort to the sign language to explain how he wants his hair cut. Being under railroad regulation, the prices are only three-fourths the rates at pretentious shops elsewhere in the city.

The man with two days' business or pleasure to crowd into one can reserve a dressing room at the barber shop, leave his suitcase there all day, rush back at 6 o'clock to get into evening clothes, with the aid of a valet if he wishes, all for 25 cents. A haberdashery adjoining the barber shop is ready to replace a lost collar button or supply anything else needed. Here, at least, men are accorded equal rights with women.

Should sudden illness seize the traveler in the Grand Central Terminal a physician from the emergency hospital, right in the building, will be at his side within a couple of minutes. If necessary the sufferer will be tucked in bed in the hospital within another couple of minutes.

STATIONS.	NORTH. Mixed Trains.	NORTH. Cro. Falls.	NORTH. Cro. Falls.	SOUTH. Cro. Falls.	SOUTH. Cro. Falls.
	a.m.	a.m.	p.m	a.m	p.m
27th Street	8.45	8.50	0.00	9 50	7.05
Yorkville	.....	8.40	3.30	9.40	6.54
Harlem	.....	8.50	3.20	9.33	6.44
Mott Haven	.....	8.54	3.24	9.30	6.40
Melrose	.....	8.58	3.28	9.26	6.36
Morrisania	.....	9.02	3.32	9.24	6.34
Fordham	.....	9.10	3.40	9.20	6.30
Williams Bridge	9.40	9.15	3.46	9.15	6.25
Hunt's Bridge	9.50	9.25	3.56	9.04	6.15
Brookville	.....	9.32	4.02	8.56	6.08
Tuckahoe	10.03	9.38	4.03	8.54	6.05
Scarsdale	.....	9.44	4.14	8.45	5.53
Hart's Corners	.....	9.50	4.20	8.40	5.48
White Plains	10.40	9.57	4.27	8.33	5.43
Kensico	10.52	10.07	4.30	8.25	5.34
Valhalla	11.05	10.15	4.47	8.17	5.27
Pleasantville	11.15	10.24	4.55	8.10	5.21
Chappaqua	11.27	10.31	5.01	8.03	5.16
New Castle	11.41	10.46	5.16	7.50	5.06
Bedford	11.56	10.59	5.25	7.40	4.59
Whitlockville	12.10	11.09	5.33	7.27	4.51
Golden's Bridge	12.20	11.19	5.40	7.17	4.42
Purdy's	.....	11.18	5.48	7.07	4.36
Croton Falls	12.40	11.25	5.55	7.00	4.30
Brewsters	1.10				
Dykemans	1.21				
Towners	1.31				
Patterson	1.41				
Pawling	1.56				
South Dover	2.20				
Dover Plains	2.50				

Old Time Table of the Harlem Road

HANDLING THE BAGGAGE

THE handling of baggage is one of the greatest problems of the big railway terminal—a problem the burden of which is felt both by transportation company and passenger.

In the model station just opened a new and satisfactory solution has been worked out for this old and vexatious puzzle.

The passenger will no longer need to hunt out a more or less remote baggage room. Under the new Grand Central system he won't need to go to the baggage room at all; he will check his baggage with the same convenience and dispatch with which he buys his railroad ticket.

On the east side of the concourses on both the suburban and express levels are baggage-checking counters. A passenger entering either of these concourses will find nearest at hand a row of ticket windows.

His transportation purchased at one of them, he passes along to another row of windows where, if he so desires, he can secure his Pullman seat, berth or section.

Continuing on his way, he comes to the baggage-checking counter. If he has hand luggage with him that he wishes to check, he goes to one section of the counter which is especially set apart for this purpose. His transportation shown, he receives a check; a duplicate is put on his valise, and the valise is then placed on an automatic carriage which bears it immediately to the baggage room, which is back of the main terminal building.

Rather than follow this valise in its trip to the proper train, let us see what happens when a man checks a trunk or other piece of luggage that has been delivered or is to be delivered at the station by express wagon. For once it is in the baggage room and properly checked all luggage is handled according to the same routine.

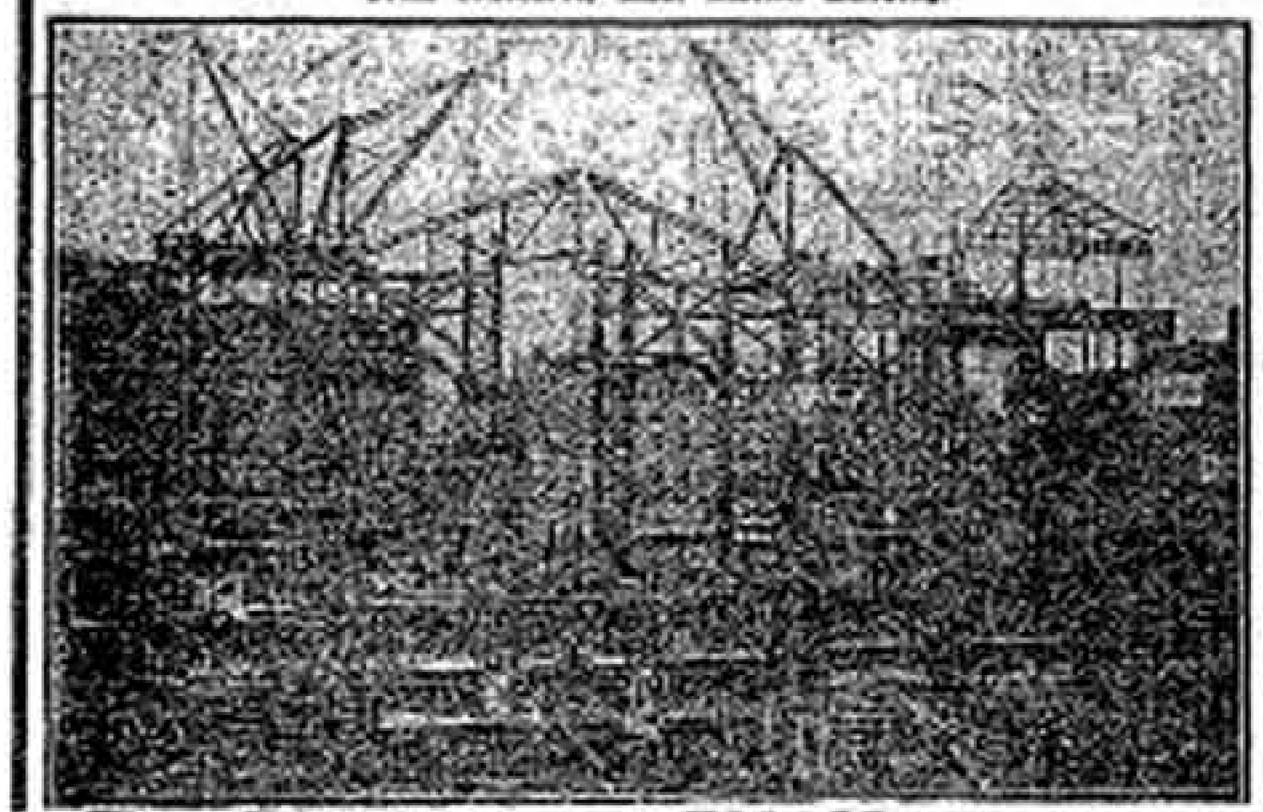
The passenger shows his transportation and his transfer or express company check to one of the men at the baggage-checking counter. A railroad baggage check is handed to the passenger, who can thereupon go his way free from further baggage cares.

The man behind the counter fastens a duplicate of the railroad check that he has already given to the passenger to the passenger's transfer or express company check, and both are dropped into a pneumatic tube and shot to the baggage room.

In the latter place a man identifies the baggage by means of the transfer or express company check; the duplicate railroad check is put on the baggage, and the baggage is immediately put in place so that it will go out on the next train leaving for the destination specified on the railroad check.

CENTRAL TERMINAL. | CENTRAL TERMINAL. | CENTRAL TERMINAL. | CENTRAL TERMINAL. | CENTRAL TERMINAL. | CENTRAL TERMINAL. | CENTRAL TERMINAL.

View showing two [illegible]-ton Terry & Tench Patent Derricks, setting trusses over [illegible] concourse, Main Station Building.

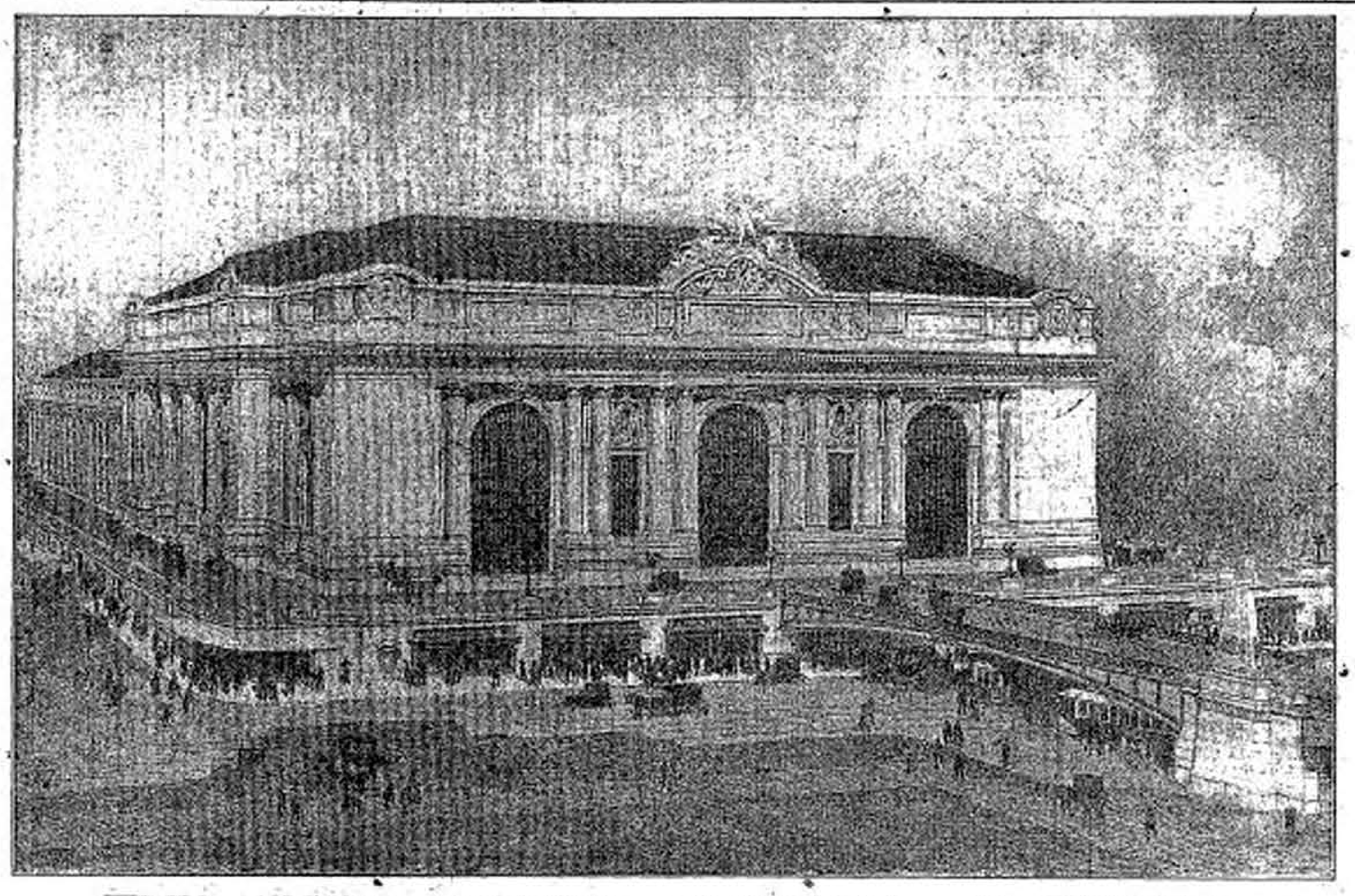


The TERRY & TENCH Co. (INC.)

has erected the following structural steel in the Grand Central Terminal with the celebrated Patent Terry & Tench Derricks:

All of the MAIN STATION BUILDING.
The NEW GRAND CENTRAL PALACE.
The BOILER HOUSE.
All of the SUBURBAN STATION South of 50th Street, between Lexington Avenue and Madison Avenue.
All of the VIADUCTS crossing the Railroad tracks between 42d & 57th Sts.
It now has the contracts for fabricating and erecting the magnificent BILTMORE HOTEL and INCOMING STATION.
The R. R. YOUNG MEN'S CHRISTIAN ASS'N BUILDING and the new ROTARY TRANSFORMER HOUSE, all of which work is well under way.

Office—Room 1042, Grand Central Terminal, New York City.



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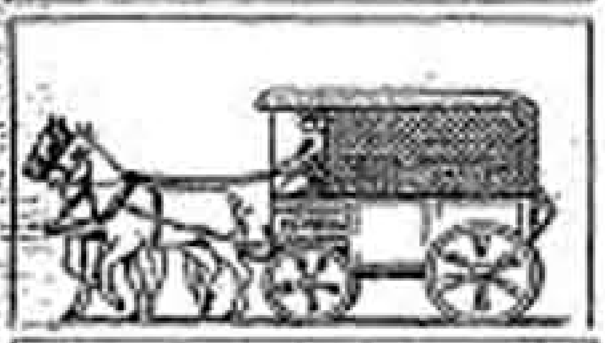

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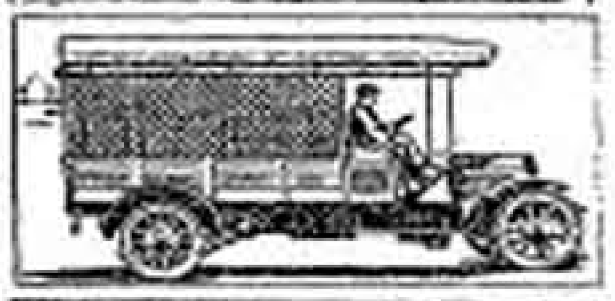

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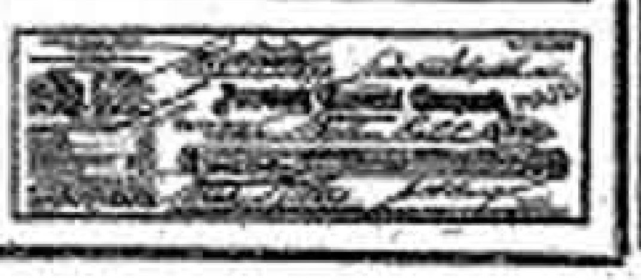

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THIS office building has a subway entrance inside the building to the present Subway and Grand Central Depot, and upon their completion will connect with the ***new Subway, Steinway Tunnel and McAdoo Tunnel.*** With the surface cars passing this corner, there is no more accessible location in the city.

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ROBERT R. FINNEY, 103 Park Ave.
A. L. MORDECAI & SON, 132 Broadway.
UNION CARBIDE SALES CO., 79 Wall St.
OXWELD ACETYLENE CO., 18 Church St.
KINGS COUNTY LIGHTING CO., 54 Wall St.
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J. EDGAR LEAYCRAFT & CO., 43 W. 42nd St.
G. A. MITTNACHT, 47 W. 42nd St.
NATIONAL ICE CO., 14 East 42nd St.
MARC EIDLITZ & SON, 489 Fifth Ave.
CHAS. HAYER, 103 Park Ave.
LORD & BURNHAM CO., 1,133 Broadway.
U. S. RUBBER RECLAIMING CO., 277 Broadway.
T. J. FALLS & R. D. JEWETT, 277 Broadway.
CARL F. JOHNSON, 5 East 42nd St.
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FONDA, JOHNSTOWN & GLOVERSVILLE R. R., 103 Park Ave.
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9 Pine Street and 5th Avenue cor. 45th Street.

FIRST GREAT STAIRLESS RAILWAY TERMINAL IN HISTORY

Unique Architectural Feature by Which Passengers Reach Trains by Easy Grades.

THE New Grand Central Terminal, which threw wide its doors to the traveling public at midnight last night, has been hailed as a stairless station, the first of its kind in the history of terminal building the world over. The first passengers to rush through this new gateway to the St. Louis Express that was scheduled to pull out of the station at 12:25 this morning found not a single stair in their way. They could go from the point where the red cross-town car dropped them in Forty-second Street, straight to their waiting berth in the Pullman, one level below the street, without finding a single step to descend. It was their introduction to a stairless terminal.

The suburbanites have known about it for weeks. Ever since that part of the terminal was put into daily use in the late Fall, those bound for the near-by towns have been experiencing that inestimable boon to a hurrying public, the gently sloping footway, leading down by almost insensible degrees to the trains depressed two levels below the surface of the city.

When the builders of the new terminal discovered the possibilities of roofing over the trainsheds to the end that revenue-producing structures might be reared above them, it was as good as settled that the station itself would be an underground station. When it was decided that the new terminal should be under ground, and not merely slightly depressed, but two deep levels beneath the street, there arose the great question of the most desirable means of communication between street and train. The engineers and architects turned the question over in their discussions, and in the end the solution was the ramp. Some of the passengers who have been using the gentle incline that leads to the already populous suburban concourse have been heard exclaiming over the novelty and ingeniousness of this arrangement.

But the idea is not new. The Grand Central builders cannot claim it as their own, although they were the first to see its value for terminals on a large scale. The idea itself is centuries old. It was evolved when a not dissimilar problem confronted the builders of the camps for the old Roman armies, and those whose duty it was to haul the wagons and heavy artillery to ramparts of a Roman city. They built long runways. So did those who built the pyramids. It is this ancient device of the long, gentle slope that has been incorporated as one of the most striking features of the latest word in railway stations.

These ramps are the gentlest of slopes. Those which lead down to the suburban concourse are, of course, steeper, but not so steep as to be unpleasant footways. Those leading to the express concourse are barely perceptible. The traveler moves from Forty-second Street to the limited train for Chicago without descending a step and without descending a slope so steep, for instance, as that Murray Hill grade leading south from Forty-second Street.

The old idea would have failed in execution if the ramps had been too steep for comfort. And in this case, it was not the comfort of the hale and hearty that was considered. The builders of the terminal decided that the ramps, if ramps there were to be, must slope so gently from the street to train as to present not the slightest difficulty to the old, infirm traveler, to the little tot toddling along at his mother's side, to the man laden down with baggage which he declines to relinquish to any one of the most cordial attendants, to the women trailing a long and preposterous train. The ramps must be convenient to these extreme types. They must suit the most halting gait or fail. It has been said of them that "the lame man decided."

So a deal of study was given over to the selection of just the right gradient. At almost every stage of the building of the terminal, the privileged spectator found the builders going to the most elaborate pains to insure perfection and efficiency. At no point was greater care taken than in this matter of the ramps. Every sort of ramp was tested, both as to angle and material. The tests were impressive in their thoroughness. Temporary ramps were set up in various parts of the station. Over these every employe, high and low, in the great army of terminal service, trudged for the purpose of "seeing how it felt." Girls from the telephone booths, men from the baggage room, boy pages and matrons, all these walked up and down the test ramps. Some went empty handed, some went arm in arm, some carried heavy bundles. Some were fat, some were lean, some tall, some short. Even the Directors of the road seized suitcases and trudged up and down in the business of gathering impressions. These were all duly noted down and the results compared. Then, too, the unsuspecting public was allowed to help in the work. Ramps were cunningly and unobtrusively put in the way of the regular stream of passengers, and the effect on the stream carefully noted by men stationed close by. Thus, the very readers of these lines, some of them, may have contributed their part to the fashioning of the new Grand Central Terminal.

Of course if the exact truth were told, the Grand Central is not a stairless terminal at all. There are flights of stairs, broad, sweeping, handsome stairs, leading from one floor to another. But these are off the direct line of passage between street and train. They are little sideways, short cuts from one part of the station to another. And the essential fact remains that it is quite possible to move from your trolley car to your Pullman car without finding stairs in your way. And that was the end desired.

The terminal builders were set against stairs. Stairs are always uncomfortable. They are worse than that when a crowd is using them. They are dangerous. A packed stairway is a fine breeding place for a panic and a disastrous one. The architects of the Grand Central shunned them, with something of the spirit of the man who said, when the first corkscrew elevator, a half century ago, began its wheezing ascent in the old Fifth Avenue Hotel, of blessed memory, that stairs were doomed. The stairs have been banished, to all practical purposes, from the terminal, and banished so effectively that that last annoying and often perilous step at the end is gone, for the station platform and the train platforms are built flush. Elevators in a terminal, soon to handle 100,000 persons a day, were impracticable. Hence the ramps.

As Virgil said of quite a different terminal, "facilis decensus." As Napoleon rode on horseback up to the top of the Campanile, so a mounted policeman from "the finest" might easily ride from Forty-second Street to a train in the lowest level of the terminal without dismounting or causing his horse to stumble. That is, what it means to have a station stairless.

There is one thing that must be said about the ramped station. It is simple to traverse. The lines had naturally from street to train, from train to street. There need be little asking of the way. Follow the ramp and you get there.

TERMINAL TRAINS RUN BY LOOP SYSTEM

THE great objection to the terminal or sub-station is the stalling of the locomotive, whether it be steam or electric. This difficulty in olden times used to be overcome by the shunting or transfer table, but now the machines are so big as to make this impracticable.

The railroads are overcoming it by any one of several arrangements. Some of these are the loop system of tracks and the "Y" system which is used very effectively in the Union Station at St. Louis, although some students of the subject consider this system rather dangerous. Another method is that used by the Pennsylvania Station in New York, which virtually gives the advantage of a through station.

It is the loop system which has been decided upon as the one to be installed in the Grand Central Terminal for both express and suburban level, but this is not yet ready for use. Some further excavation, notably beneath the hospital now being torn down at the corner of Lexington Avenue and Forty-second Street, will be necessary. It will probably be all of another year before the many trains that daily pull in and out of the new terminal can make use of the loop convenience.

The great train capacity of the station will be due to this system. This is estimated at a maximum of two hundred trains an hour. Instead of trains coming in, discharging passengers, and backing out in the old cumbersome fashion, they will continue, when empty, around the loop under the southerly front of the station; and then will run over to one side of the station yard, where they will be cleaned and made ready for the next trip.

The Grand Central authorities have decided on the loop system with a deal of confidence and enthusiasm. They say, in its behalf, that it will enable them to handle in the terminal all the train business of a six-track road.

There have been some, however, among those interested in the selection who have felt that something better might have been done. Among these is Mr. Whitney Warren, of Warren & Wetmore, chief architects of the terminal. Mr. Warren approved some form of the shuttle system in preference to the loop in the belief that a too heavy system might bring congestion, even in a "looped" terminal.

"The shuttle system is used to perfection on the Brooklyn Bridge, where the trains weave in and out in a wonderful fashion," Mr. Warren said the other day. "They can send 1,000 persons a minute over the Brooklyn Bridge, and no one pays any attention to it. It is really marvelous and not to be appreciated until it has been witnessed from the starter's tower."

The necessity of some such system as the "loop" is better appreciated when the magnitude of the train dispatcher's task at the new terminal is realized. It must be remembered that it has a total of sixty-eight tracks, of which forty-six have platforms, as against twenty-one tracks in the Pennsylvania Station, thirty-two in the South Station, Boston, or the St. Louis Union Station, and against eighteen in the Frankfort-on-the-Main Station, Germany.

These figures and comparisons are sufficient, even for the most inexpert, to suggest that the new terminal has been built to last for many years to come. How many years no one knows. The traffic growth that has compelled the road to build in such rapid succession the homes that succeeded the little old station at Madison Square has been so enormous that all attempts to compute the future growth on the basis of the old advance have been simply staggering.

No one assumes that the present terminal will serve forever, but, according to the Grand Central authorities it will be fit to permit the passing through its gateway of 100,000,000 persons every year. When the traffic exceeds that, who knows? It has already been suggested that by that time the growth of New York and the swelling of the tide of traffic will force the station to some position beyond the Harlem River.

Indeed, even when the question of building the present terminal was first under serious discussion, the wisdom of retreating to Harlem was debated. But the new terminal opened to-day is good for many years to come.

TERMINAL'S FIRST ARCHITECT

IT has been said of the new Grand Central Terminal that no building in ancient or modern times has been made the subject of such an exhaustive study. Two New York firms of architects, Warren & Wetmore and Reed & Stem, collaborated on the work. To the former firm has been ascribed the credit for the broad outlines of design and the general aesthetic treatment of the subject, while Reed & Stem have been credited with what has been called the "engineer-architect" feature of the work. Everywhere to-day, the passerby hears applause for the outcome, and among good judges there is a general agreement that the collaboration was fruitful of good result.

At the outset and until little more than a year ago, Charles A. Reed, head of the Reed & Stem firm, was at the head of the board of architects, but Mr. Reed died on Nov. 12, 1911, and since then the firm of Warren & Wetmore has brought the work to the conclusion signalized by to-day's opening. Throughout the architectural world it was recognized as a thing of peculiar pathos that, just on the eve of the emergence into visible result of this, the largest and most ambitious work of his long career, he should have had to leave it.

By official title Mr. Reed was executive head of the New York Central & Hudson River Railroad Company architects. He was graduated from the Massachusetts Institute of Technology, and the last thirty years of his life were devoted to railroad station building.

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113-115-117-119 WEST 40TH ST. RUNNING THROUGH TO 114-116-118 WEST 41ST ST.

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A Whole Block in Depth

The only wholesale office building in this section.

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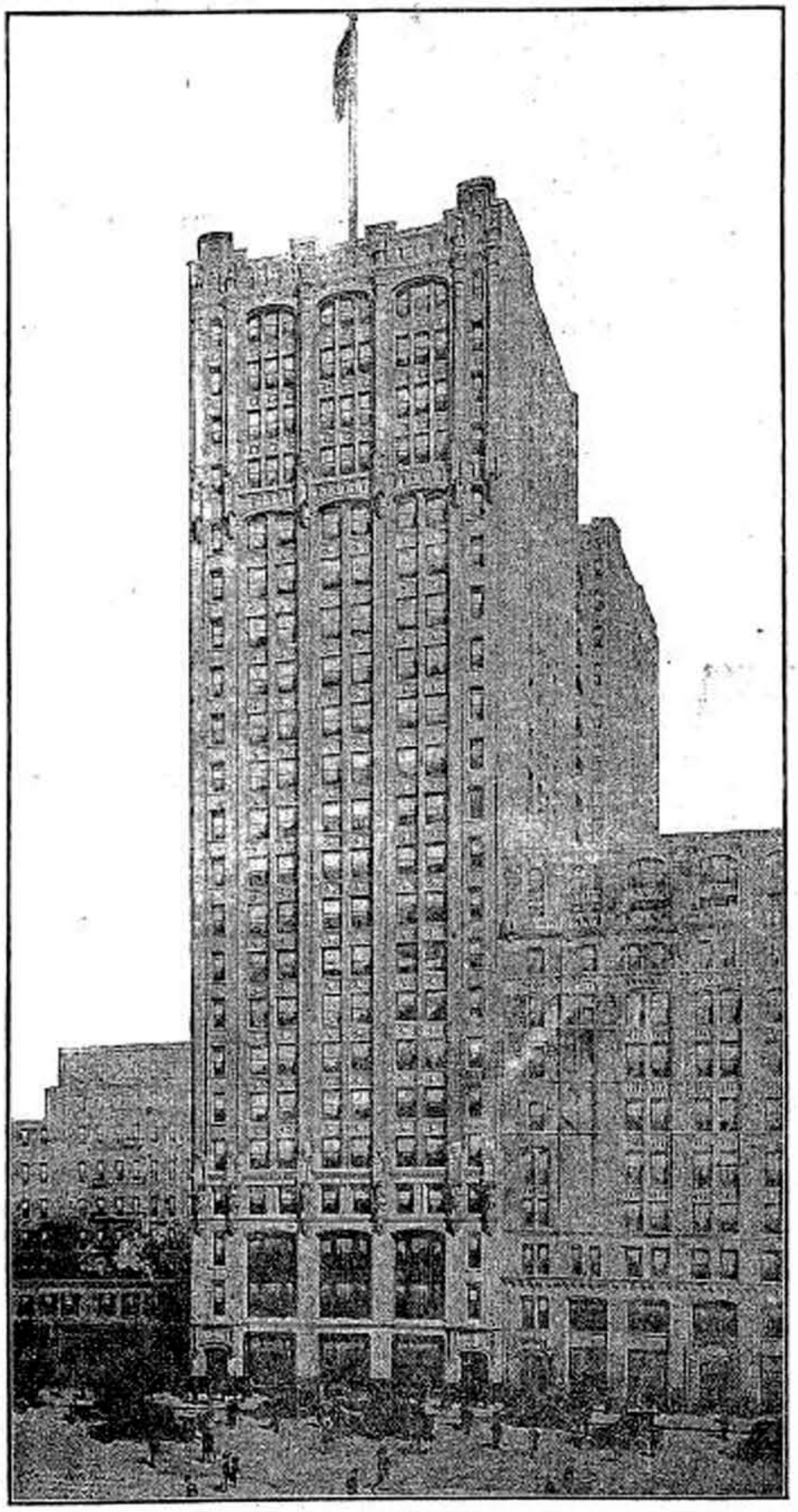

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Sprinkler system and supervisory fire-alarm sprinkler system throughout the building.

Eight high-speed elevators.

Its construction incorporates every improvement and convenience the present day offers.

Low { Rentals / Insurance }

Inspection invited.

Full particulars and floor plan can be had at

WEST 40TH & 41ST STREETS REALTY COMPANY, 88-90 FIFTH AVENUE

(OR YOUR OWN BROKER)

ONE SIGNAL TOWER CONTROLS SEVENTY-NINE ACRES OF TRACKS

SEVENTY-NINE acres of tracks over which come and go almost a thousand trains a day, all controlled from one central signal and switch tower!

To the railroad man that is one of the greatest of the mechanical triumphs that the completion of the New Grand Central Terminal typifies.

This tower is the central nerve point, the brain of the terminal. It gathers under one masterful control the bewildering train movements over the intricate web of tracks that lead into that great station.

Not a wheel can start to turn without the consent of that nerve centre. Not an incoming train, with its precious human load, can enter on its final approach to the platform until the terminal brain has signified its permission.

Needless to say, it is electricity that makes this terminal brain or nerve centre possible; that permits the operator in the tower to instantly reach here and there over the seventy-nine acres of tracks, throwing switches and setting signals.

This electric brain, or (to drop metaphor) this electric switch and signal tower, is at Fiftieth Street.

This central operating station is, in itself, worth going a long way to see.

It is the twentieth century idea in the electrical control of trains. It is the largest thing of its kind in the world, and to the perfection of its operation is committed the safety of millions of passengers a year.

In the old days, when the tracks were open to the sky, it took an army of men to throw the switches by hand in the terminal yards. Later, with the coming of the control of switches from the towers, it took a smaller army to throw the long levers back and forth. That was called the manual system.

Then came the automatic system that was worked by compressed air, then the combination of air and electricity. Now it is electricity alone that does the work.

This main signal tower is a four-story building below the street level, and houses the interlocking machines by which the switches and signals are operated. The machine for the suburban level is the largest ever constructed, and has four hundred levers, each of which operates a switch or signal. On the floor above is a machine with three hundred and sixty-two levers, operating the switches and signals on the express level.

To each forty levers a man is assigned who works under the instruction of a train director, who decides upon the track whereon each train is to be placed. The movement of the trains is indicated by little electric lights on a chart which is a fac simile of the track layout of the yards. As the trains pass over the switches the lights on the chart are extinguished and not relighted until the train has passed over the switch onto the next one.

To get an idea of how this intricate system is worked, let us visit a long, narrow room on the second floor of the signal tower. It is from this room that the switches and signals of the suburban level are operated.

In this room there is something that looks like a handsomely finished oaken case. It is about seventy-five feet long, about as high as an ordinary upright piano and about as wide.

Inside, but concealed from view, is a maze of electric wires—slender cords that resemble the seeming tangle at the back of a big telephone switchboard.

In front, breast high, is a double row of metal handles, each with a straight grip a hand's breadth long, one up and one down alternately.

Over at one side of the room, about halfway down its length, a man sits at a desk on which a telegraph instrument chatters intermittently. On a frame of ground glass beside him is etched a map of tracks in the terminal, spreading out fanwise from the mouth of the tunnel under Park Avenue. A little circle about half the diameter of a dime marks the point where each track branches off.

As soon as the train "hits the hill"—as they call emerging from the tunnel mouth—the first bulb lights behind the first of these little circles. The tower director—the man at the telegraph key—knows that the train is coming, for he has been advised of its progress ever since it reached High Bridge or Mott Haven Junction and knows just what he is going to do with it, just where he is going to place it, as soon as it gets within his reach.

The tower director looks over to the men standing before the long row of handles and says, "124" or "58."

Each handle has a number above it. The man who has the number called within his division of the long box pulls the corresponding handle. As he does so he feels a tiny thrill that is the indication that the "high field" motor that controls the switch is doing the work. Then there is a gentle click, which is the second "indication" telling of the release of the armature magnet. A little square of round glass above the handle is illuminated and shows that the switch and signal are set. Another little circle lights up on the tower director's map, another number is called, and so on until the train or the engine is at the end of its journey.

Should the tower director call a wrong number or should one of the men misunderstand him and pull the wrong lever the electric indicators would show the error at once. Not only that, but that particular section of the interlocking system of switches and signals on the tracks outside would show it to the eye of the engineer.

Even if the engineer did not see it the train would be "tripped" automatically and brought to a stop until the error was rectified.

So accurately is the movement of the trains indicated by the little electric lights on the chart which is a fac-simile of the track layout of the yard, that the exact position of every train at every moment is known, even to the point of the last car's location and that of the front of the electric motor.

Nor is such a mass of important detail rendered burdensome and therefore confusing to the operators. Like the accurate vision of the eye, the brain of the terminal takes in without apparent effort the entire situation. "At a glance" is the only word for it.

The room is perhaps not solemn to the men, but it seems so to you. The air is heavy with duty. You do not speak. You would shrink back at the very touch of those great levers, nor can you be induced, hardly, to throw one, though you are told it is not in use and you are invited to throw it by way of explanation.

Should one of the operators turn to address you for a moment, you instinctively ask him not to take his eyes off his work.

Sometime or other you may have been admitted to the wheelhouse of an ocean steamer. But you quickly realize that, except perhaps in the manœuvers of a battle fleet, a pilothouse is nowhere near so momentous as is one of the signal rooms in this tower.

In a signal tower the emergency is not the exception; it is the whole thing. Every moment is emergency, either actual or possible.

"I hear people talk about emergency brakes," said one of these operators. "I see emergency wagons about the streets. The emergency hospital is down the avenue below my house. I smile. Why, I eat, drink and breathe emergency in my work. It is funny, but you cannot surprise me with anything. My wife knows that. If the baby fell out of the window my nerves would not jump. I really don't like it, for I can have no thrills. I am always cool. That is what my job has done for me."

In addition to the throwing of switches and the setting of signals on the railroad tracks, electricity has been utilized for numerous other lesser signal devices.

Not the least important of them, and like so many of the others, an entirely new feature in terminal signaling, is the system of advising the gateman on the concourse when to open the gates and admit passengers to the trains.

An electric lamp is sunk in the hand-rail in front of each gate and when the train is ready to receive passengers the conductor presses a button, illuminating this lamp, thereby notifying the gateman that all is ready. At the moment the train is due to leave the gateman will close the gate and press a button located on the same hand-rail, which will illuminate a lamp on the platform near where the conductor will stand, thereby notifying him that the gate is closed and he may proceed.

Thus far mention has only been made of the use of electricity in connection with the signal and switch system of the new terminal.

Although in this quick-moving age it is a comparatively old subject that was thrashed out a few years ago, some mention should be made of the use of electricity as the motive power in this mammoth station.

As has been said in a previous article in this section, it was the substitution of electrical for steam traction that made possible the utilization of the air rights by the building of a terminal yard and station entirely below the street level.

The important question then presented itself as to what system of electric traction would best meet the conditions.

President Newman quickly realized how vital a question this was. There was no precedent whatever to go upon. The conditions were new; the problem quite untried. Moreover, at this time there were two great rival systems of electric traction in the field, the direct current and the alternating current.

President Newman organized a special board of electrical and engineering experts to thrash out the question. It took them two years to come to their final conclusion that, all things considered, the direct-current, third-rail system would best meet the conditions.

The New York, New Haven & Hartford Company also has its terminal at the Grand Central Station. The management determined to electrify its main lines as far as Stamford, Conn., and, after mature consideration, it decided to adopt the alternating-current, high-tension system, using 11,000 volts in an overhead line.

The New York Central suburban electric zone was to extend thirty-four miles to Croton on the main line and thirty miles to White Plains on the Harlem.

The direct-current system, it is said, has the advantages that the third rail affords a more compact and ship-shape system of construction; that the pressure is lower; and that the risks of accident are reduced practically to the vanishing point.

The company has done the electrical world great service by publishing very complete details of the original cost, cost of operation, and the risks and accidents of operation, thereby placing the art of steam, trunk-line electrification in possession of a large amount of very useful data.

As has been said, the buildings in the terminal area are erected over the tracks of the yards, and consequently where ordinarily the heating, lighting and power machinery is located trains are running back and forth. To overcome this condition, a power and heating plant of great magnitude was erected at Fiftieth Street, between Lexington and Park Avenues, and therein is assembled the machinery for lighting and heating all the buildings in the terminal, both present and prospective. The hot water used in heating the general office, Post Office and station buildings travels over a mile before it returns to the heating plant.