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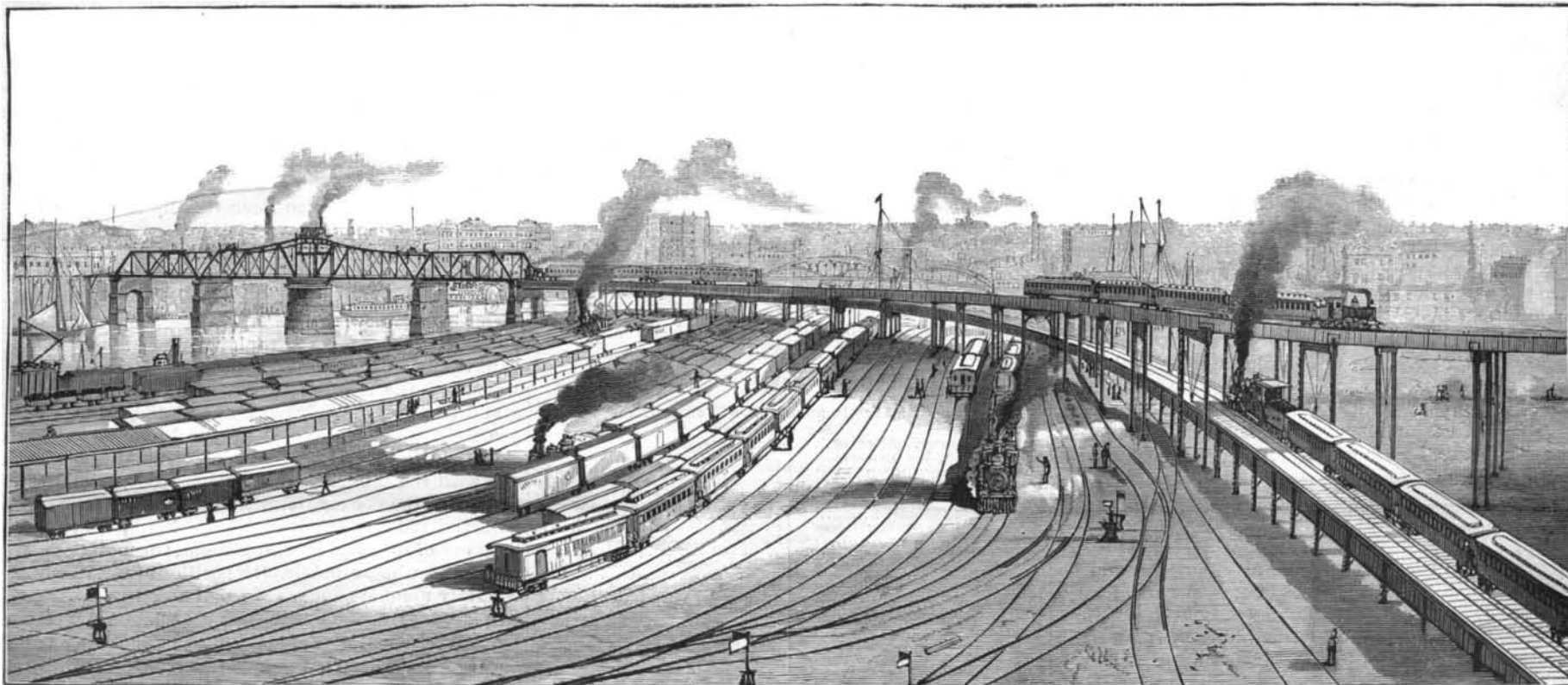
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PLANS OF THE SUBURBAN RAPID TRANSIT CO.
The accompanying engravings accurately represent the work now being done by the Suburban Rapid Transit Company, of this city, across and on the northeastern side of the Harlem River at the head of Second Avenue. The views, being confined solely to the immediate neighborhood of the bridge, convey no idea of the real magnitude of the work to be done by the company and the influence it will exert in aiding the development of the annexed district north of the Harlem, or of the increased facilities it will afford the railroads entering from the north for reach-

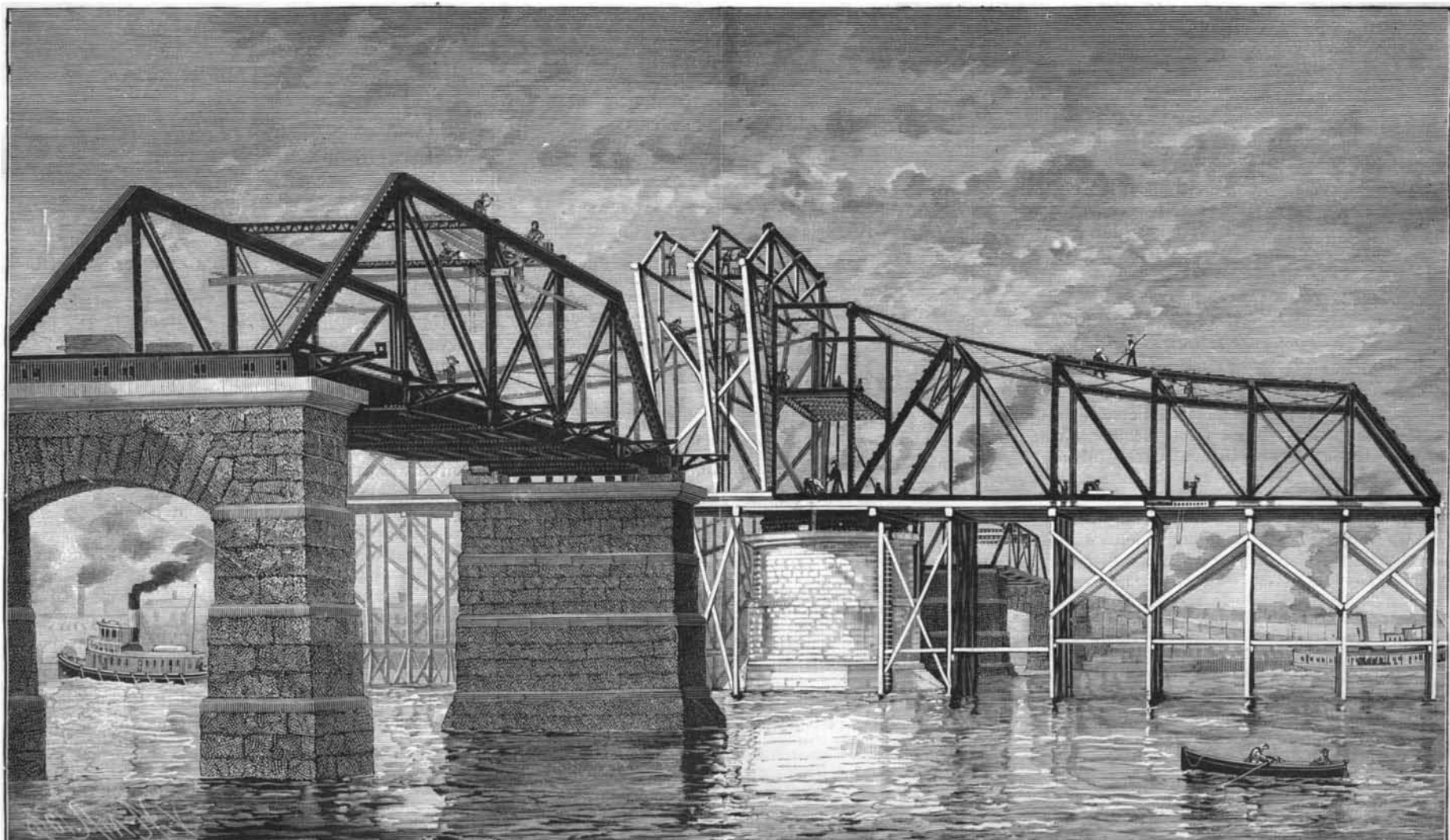
ing the lower part of the city. The Harlem will be crossed by a drawbridge on a level with the Second Avenue elevated railroad. On the north shore there will be four elevated tracks leading from the bridge; the two center ones will run down and terminate in the yard of the New York, New Haven and Hartford railroad, and the two side ones will be continued in a northerly direction as elevated roads. (This is the portion of the work embraced by the engravings.) The plan contemplates the construction of three parallel lines through the Twenty-third and Twenty-fourth wards, uniting, of course, at the bridge. This

will not only accommodate all local travel, but will also provide a downtown outlet for all the steam railroads crossed by it.

The bridge is a pin connected through structure 245 feet in length from end to end, 26 feet in width from center to center of trusses, 20 feet deep in clear at the ends, and has a foot walk 6 feet wide at each side and a double track railroad in center; the clear opening each side is 103 feet 9 inches. The piers are masonry, supported in some cases upon piles and concrete, and in others extended to a good natural foundation. The center pier is 32 feet 9 inches in diam-



GENERAL VIEW OF SUBURBAN RAPID TRANSIT CROSSING OF THE HARLEM RIVER AND YARDS OF THE N. Y., N. H., & H. R. R.



VIEW OF THE HARLEM RIVER BRIDGE OF THE SUBURBAN RAPID TRANSIT COMPANY, NEAR SECOND AVENUE.

ter; all the piers are of such height as to raise the structure 28 feet 8 inches in the clear above water level. The bottom chords consist of latticed channels—12 inches—varying in section according to the strains coming upon them. The upper chords extend upward in a parabolic curve toward the center. All the posts are latticed channel columns, and the diagonals are forged links. The floor beams are plate girders, and are suspended from the lower chord pins by plate hangers, and the foot walk brackets are riveted to the hangers by the same rivets that secure the floor beams.

The drum of the draw, which is entirely rim bearing, is 26 feet in diameter, and is formed of two channels 12 inches deep. The weight of the span is transferred to and distributed over the drum by two longitudinal girders in line with the trusses, two cross girders under the central posts, and short inclined connecting girders. All the hydraulic machinery for operating the wedges and turning the bridge is in a room, the floor of which is carried on girders riveted to the central parts of the trusses at an elevation equal to that of the portals. The bridge rests and turns upon a ring composed of 54 cast iron coned wheels, 16 inches in diameter at the base, which are spaced and held truly radial by two guide rings, one inside and one outside of the wheels. The axle of each wheel is connected by a tension rod to a movable center, to which the guide rings are also braced by struts of angle iron. This resembles a large horizontally placed wheel, the hub being formed by the movable center, the spokes by the tension rods and axles, and the face by the cones. The axes of the wheels are inclined upward, toward the center, at such an angle as to bring the upper bearing lines of the wheels in a horizontal plane. The upper bearing plates are of wrought iron planed flat, and the lower track circle is of cast iron segments bolted together by lugs and firmly anchored to the masonry; its bearing surface is planed to conform to the inclined position of the wheels. The outer guide ring for receiving the operating ropes that turn the draw is supported by cast iron winged nuts projecting from the outer ends of the axles. The movable center turns upon a steel shaft 6 inches in diameter. At each side of the draw is a fixed span, supported upon masonry piers of 95 feet from center to center. The drawbridge was erected upon false work resting upon piles and placed parallel with the river, as shown in the lower engraving.

To properly shift the twenty-nine tracks in the yard so as not to interfere with their use, and at the same time obtain the requisite space in which to place the posts supporting the elevated roads, was a task requiring care and judgment. The difficulty may be understood from the fact that in the completed structure there are no two girders, no two elevations, and no two skews alike. The plate girder spans are of varying lengths to suit the tracks, and vary in depth from 42 to 72 inches, in proportion to length of span. The cross girders are from 30 to 60 inches deep. The columns are 12-inch latticed channels, and vary in section, according to the load brought upon them by the spans. No longitudinal bracing could be put in on account of the lower tracks, the minimum head room being 15 feet. All the work is proportioned to carry heavy Mogul freight loads.

The outgoing suburban track crosses the center ones, which run to the yard, and after leaving the bridge turns to the right and extends parallel with the yard tracks to a point where the descending center tracks permit its crossing. The maximum grade is 65 feet per mile. The incoming track is independent of the others. The center tracks approach the ground by an easy grade.

Mr. S. R. Filley is the president, and Mr. J. J. R. Croes is the chief engineer of the company. All the iron work was designed by Mr. Theodore Cooper, consulting engineer for the company.

Two Thousand Miles on a Bicycle.

The longest bicycle ride ever made has just been completed by Mr. H. R. Goodwin, of the North Manchester Club. Leaving Land's End on June 1, he journeyed to John o' Groat's, having reached which point in 7½ days, he at once turned southward, and again arrived at Land's End on the 16th, the double journey of about 1,750 miles, or from one extremity of England to the other, having occupied less than 16 days. From Land's End he rode to London, which was reached on the 19th, the rider having thus completed a journey of 2,050 miles in exactly 19 days, or an average of 108 miles a day. Mr. Goodwin rode a 40 inch "Facile" safety bicycle, and arrived in London well.

The Deepest Bore Hole in the World.

The deepest boring yet made is at the village of Schladebach, near the line between Leipzig and Corbetta. It has been made by the Prussian government to test for the presence of coal, and was bored with diamond drills. Its depth is 1,390 meters (4,560 feet, its breadth at the bottom 2 inches, and at the top 11 inches. It has occupied 3½ years to bore, and cost a little over £5,000. The temperature at the bottom is 118° Fah.

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Table listing contents of the supplement by category: I. CHEMISTRY, II. ENGINEERING AND MECHANICS, III. TECHNOLOGY, IV. PHYSICS, V. GEOLOGY, VI. HORTICULTURE, VII. MEDICINE, ETC., VIII. MISCELLANEOUS.

GENERAL GRANT.

At eight minutes after eight on Thursday morning, the 23d of July, 1885, the lingering illness of America's greatest citizen terminated in death. General Grant was no more. Nine months of weary fighting against an incurable disease had brought so much pain and suffering that even those to whom he was most dear could not but feel a sad pleasure that the conflict was finally over and the great hero at rest. With his sickness we are all familiar, and from North to South the whole country has felt but one sentiment, that of profound sympathy for an illustrious sufferer, whose terrible illness experienced but little alleviation and could know no cure. And now that it is all ended, and the sad message has been flashed around the globe that the peace of death has fallen, that the world has lost a hero, the nation which claimed him as her own, and the people who delighted to do him honor, remember their loss and mourn for their illustrious dead. Though the remarkable career of General Grant is known in its outlines to all of us, and though many of us have followed the brilliant life from the time when his name was first heard over the land to the time when death came, yet it is, nevertheless, a pleasure to recall again the history of a man whose destiny was so closely linked with that of the nation, and whose achievements have added so much to her glory.

It seldom occurs that a man who at sixty-three occupied the position accorded to General Grant, is at forty almost totally unknown, yet at the beginning of the Civil War such was the case, and few things seemed then so improbable as that this quiet, self-contained man should ever reach a cosmopolitan fame. It is true that he had distinguished himself in the Mexican War, that at Monterey, Vera Cruz, and before the city of Mexico he had shown those splendid soldier-like qualities which were afterward to be tested in a conflict where the opposing forces were more equally matched; but his services seemed to attract but little attention at the time, and we find him shortly afterward settled quietly on a small farm, bearing the bitter burden of poverty and failure. But with the fall of Fort Sumter his career began anew, and from his obscurity at Galena he passed with wonderful rapidity through those brilliant campaigns which resulted in the capture of Fort Donelson, the carnage of Shilo, and, finally, in the grand triumph at Vicksburg, and placed him in three years' time at the head of the Federal armies.

At that time events closely followed upon each other, and with the Wilderness Campaign, the fall of Richmond, and the welcome termination of an unhappy war, his active military duties ended, and left him, who had been one of the most obscure citizens, the most popular man in the whole republic. His position at this time was certainly unique; no one else, perhaps, has ever been so placed. He was by all odds the man most available as a presidential candidate, and, curiously enough, could have received the nomination of either political party. Nothing redounds more to the credit of this great general, to whom so much honor has been given, than the deep sentiment of respect which has always been felt towards him by those people whom he was forced by circumstances to subdue, and to-day many of the most touching tributes to the memory of the dead hero have come from the South, from the very men who were conquered by his genius. It is indeed a great thing that the central figure of a civil conflict should hold the affection of an entire people, that he is regarded without bitterness, and mourned as the nation's loss.

PETER H. WATSON.

Among the strong, brave men who bore conspicuous parts in the late rebellion, though little known to the general public, was the late Peter H. Watson, who died at his apartments in the Albert, Eleventh street and University Place, this city, July 23, in the 68th year of his age. Mr. Watson was assistant to the late "Iron Secretary of War," Mr. Edwin M. Stanton.

Mr. Watson was literally a self-made man. Commencing his career at Washington City as a solicitor of patents, by indefatigable perseverance and industry rose in his profession to the highest point. When Mr. Stanton was called to the Cabinet of Mr. Lincoln, Mr. Watson abandoned his lucrative profession at the urgent request of Mr. Stanton, and entered the war office as assistant, and during those stirring times rendered important and valuable services in his department, and when the war closed, like the other members of that remarkable administration, returned to private life and the pursuit of science, to which he was inseparably wedded. Notwithstanding Mr. Watson was not prominently before the public, he was nevertheless personally known and highly esteemed by the great men of his time; and not a little singular is the coincidence that he should die on the same day with General Grant, for whom he held the highest admiration, having known the great commander intimately, at the time when truly "men's souls were tried."

In speaking of Mr. Watson, we join all who knew him in expressing our sorrow at his loss personally, and to the scientific world, and accord to him every praise for his faithful and indefatigable services throughout