The New York Subway

Pauline E. Hopkins

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It is a common saying among men of affairs that there is always a way to “make good” any bright business scheme, on a decently honest basis, in New York; therefore the city overflows with representatives of every department in life, commerce, art, literature, the road to success for all may be found in the mazes of the great metropolis. New York is the living embodiment of true Americanism. Through the enterprise and energy of its citizens the country has received the benefits of many great projects carried to completion by the expenditure of vast sums of money voted out of the State or city funds or very often provided by private individuals who appreciated the future benefits that these enterprises would give to futurity.

All nations have been made what they are by the thinking and working of many generations of men. Patient and persevering laborers in all ranks and conditions of life, cultivators of the soil and employers of the mine, inventors and discoverers, manufacturers, mechanics and artisans, poets, philosophers, politicians, all have contributed towards the grand result, one generation building upon another’s labors, and carrying them forward to still higher stages. This constant succession of noble workers--the artisans of civilization--has served to create order out of chaos in industry, science and art; and the living race has time, in the course of nature, to become the inheritor of the rich estate provided by the skill and industry
of our forefathers, which is placed in our hands to cultivate, and to hand down, not only unimpaired but improved, to our successors.\(^1\)

Thus the American people owe a debt of gratitude to Robert Fulton, the engineer, who studied in England the adaptation of the steam engine to boat propulsion and applied his knowledge in the construction of the first large steam vessel, which made its trial trip on the Hudson in the year 1807. The projectors of the Erie Canal in 1826 connected the Hudson with the Great Lakes and brought to the great ports of transportation, the grain fields of the West. The projectors of the Brooklyn Bridge gave to the world the largest suspension bridge in existence. And so we might go on enumerating indefinitely, the stupendous enterprises undertaken by New York. The latest surprising event has been the completion of a twenty-one mile tunnel opening a new era in rapid transit for over populous cities. The building of this tunnel has been a formidable task calling for a union of all the arts of modern engineering. To be sure there are other subways, for there is the Boston subway and the greater feat of tunneling under Boston Harbor to East Boston, both of which called forth the highest courage and endurance on the part of promotors and engineers; but the New York subway boldly attacks the wholesale transfer of surface traffic to a twenty-one mile tube built under the ground. It is an example which other great cities must follow in the near future.

At seven o’clock p. m., on October 28, 1904, with nothing to mar its perfect success, the great New York subway was opened to the public and became an actuality after years of agitation and legislation out of which the present project grew. It was decided that the city should

own the system but that it should be constructed under private contract on money loaned the contractor by the city to be repaid by him with interest. It has required six years to lay out the route and plan the make-up of the great tunnel, and this work was done under the provision of a commission of which Alexander E. Orr was president and John B. McDonald chief engineer. When this preliminary work was done, bids were called for, and the contract was let to Mr. McDonald who distributed sections of the work to various sub-contractors.

THE TUNNEL

A short flight of steps leads down to the platform of the station the walls of which are finished in white tiles with decorations in colors. The walls are dry although the air is not so clear and wholesome. Electric cars in trains, run by the third-rail system, are used but no third-rail will menace life, for it is covered by a steel cap making it perfectly safe for foot passengers. The dim light of electric bulbs reveals countless steel pillars lining the distance. The subway is not only useful but beautiful. In the whole project the aesthetic has been kept in mind. Rockwood pottery, faience, and marble are used in many tints and in countless designs. Glass roofs provide the stations with plenty of light. Each station has its own color idea, and the decorative scheme is varied in each; they are commodious and brilliantly lighted, and the finishings are all of bronze, brass or other metal, woodwork being eliminated as far as possible.

The system is electrical, one great powerhouse developing the required energy. The cars are of the latest type, being especially designed for the system and are either copper or steel sheathed. Every known device has been employed to insure safety for patrons.

The tunnel runs north to Forty-second street in the shape of an irregular Y the stem resting at City Hall, it bends west to Broadway out to One Hundred and Third street where it diverges in a northeastern direction under the corner of Central Park and on out to Harlem river
under which it passes by means of a tunnel made famous by the enormous difficulties surmounted by the engineering corps.

CONSTRUCTION OF THE TUBE

The construction of the tube has involved difficulties of a character probably never before faced in such a work. Portions of it pass under sky-scrapers necessitating costly and specially designed supporting systems. Other problems to be solved were the displacement of hundreds of sewers, masses of intricate and interlaced electric wires, gas, water and steam-pipes, and all this to be done without seriously interrupting the services of these essentials to the life of a great city. Old foundations were encountered, quicksands, strongly flowing springs and long forgotten streams frequently tested the ingenuity of experienced modern engineering. About 3,000,000 cubic yards of excavation were made of which one-third was through stone which required the invention of expedients for the safe use of explosives. Then the subway must be dry. To insure this the top, sides and bottom were constructed of concrete and waterproofing in alternate layers, incasing a framework of steel beams. The roof was supported by steel pillars about five feet apart in parallel rows in the concrete of top and bottom. The subway is, therefore, thoroughly waterproof.

All the water-pipes, gas-pipes and sewer-pipes were hung up by chains to the beams supporting the street until blasting was over and then forty-five miles of new pipes were laid in neat and orderly style thus bringing order out of former chaos. Miles of sewers were rebuilt mostly of concrete, that material being found to be cheaper than the old brick structures. But by far the most interesting section was that which crosses Harlem river. The contractors evolved for this an unprecedented engineering device which worked out so successfully that it will probably be used in the future in tunneling under rivers.
Every modern device has been used to hasten the work and to lessen the cost while giving strong and safe work. The drilling was performed by automatic compressed air drills. More than sixty-two thousand tons of steel went into beams and girders. More than three and one-quarter millions cubic yards of material was removed by electric conveyers from the trenches to waiting carts.

In an article like this, one can only give but a brief sketch of the wonders of this marvellous work which cost $40,000,000.

The contract under which McDonald undertook the work provided that he should construct the subway road in four years at a cost of $40,000,000; that he would have the right to operate it for fifty years, with the right of renewal for twenty-five years; that the city would furnish him with $40,000,000 by an issue of bonds bearing three and one-half per cent. interest, and that in fifty years he should repay the $40,000,000 and interest by annual installments. The entire property would belong to the city, and at the end of the lease the city could release the property on its own terms to whom it pleased. The contractor was to make his profit out of the construction and operation of the road.

“TO HARLEM IN FIFTEEN MINUTES”

“Fifteen minutes to Harlem” has long been the cry of New Yorkers and no one can blame them who has once experienced the jostling and jamming of a crowd at Brooklyn Bridge or on the uptown surface and elevated. Words cannot describe the perils of the situation. But relief from congested conditions is now practical and “Harlem in fifteen minutes” is at last consummated.
The 2 o’clock p. m. train of October 28, carried an immense crowd of officials and invited guests. It was an experimental trip and no stops were made and the train made up of six cars dashed over the rails to Harlem in exactly ten minutes and forty-seconds.

At seven o’clock the stations all along the line were crowded with eager passengers and 10,000 tickets were sold during the first hour, and at midnight 125,000 tickets had been sold. As the result of observation of traffic under conditions which are expected to be permanent, General Manager Hadley announced that the subway can handle about twice as many passengers as had been placed in the highest estimates--that is, 25,000 passengers per hour, or 500,000 in twenty-four hours. Mr. Hadley doubled these figures after his observations from 7 p. m. until eleven on the evening of the opening day.

There is no doubt that there will be a tremendous rush of people to use the subway cars as there are now 140,000 passengers during rush hours on the surface and elevated down Manhattan Island, and about 35,000 crossing between Brooklyn and New York at the same time.

The subway is the consummation of years of study of the transportation problem on Manhattan Island, and marks the completion of the first stage of what will be the most complete system of rapid transit in the world. Considering the peculiar difficulties faced by its builders, it stands as a unique feat of engineering and construction.

As a befitting close to the subway opening celebration, the directors of the Interborough Rapid Transit Company gave a dinner at Sherry’s in honor of Mr. August Belmont who financed the building of the tunnel, and as president of the Interborough company will direct its operations. At the close of the dinner, Mr. Walter G. Oakman, vice-president of the company, on behalf of the directors, presented to Mr. Belmont a magnificent loving cup as a token of their esteem.
We cannot close this article without again reverting to the greatness of the Empire City of the United States. Wonderful, indeed, is the country which produces so magnificent a metropolis. But we hope that the warning words of Emerson will forever impress this country and its citizens:

“The civility of no race is perfect whilst another race is degraded.”

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