

**NEW METHOD OF GAS SUPPLY FOR NEW YORK CITY.**

The city of New York, at the present time, is supplied with gas from works situated within its limits, not merely inside of the corporate lines, but in close proximity to the most thickly settled districts. In old times, when gas was made from bituminous coal, and of course on a far smaller scale than at present, gas works gave but little annoyance to those living near them. Almost the only source of annoyance was the disposal of the foul lime from the purifiers.

The increase in extent of the petroleum industry has brought about the introduction, on an enormous scale, of naphtha into the gas manufacturing industry. At the present time not far from 1,000,000 barrels measurement of naphtha are delivered in this city annually. The use of such large quantities of naphtha not only involves production of more or less disagreeable odors, but is attended by great danger of conflagration, whatever precautions are taken. There is always a chance of the naphtha breaking loose, and if it once catches fire, there is no telling where the damage will end. The naphtha tanks are generally situated close to the river fronts, so that the escaping fluid might find its way to the river, and, if so, by burning and floating, would carry the flames far and wide.

At present there are three companies in practical operation supplying the city with gas. The great consolidation brought about some years ago omitted one company, and since then a second has been put in operation, thus completing the three.

We illustrate in this issue the work that is now being carried on with a view to the introduction of gas into the city from across the East River. The East River Gas Company is a corporation that possesses rights of the most liberal description. Its charter authorizes it to make and supply gas and electric power, and to condemn property if necessary for its purposes, with full power to lay pipes throughout the city. It also is organized to consolidate or purchase the property of present gas companies. Its present works are in Long Island City, opposite 71st Street, New York. They have hitherto comprised a small Low gas plant, which is at present manufacturing and supplying gas to the district and its vicinity.

Plans have been made for the construction of an enormous plant for carrying out the Low process under the methods of the United States Gas Improvement Company. These plans provide for a works of a capacity of 24,000,000 cubic feet per day. Work is at present in progress on what may be termed a 6,000,000 cubic feet block of these works. A three-lift gas holder of 650,000 cubic feet capacity is now in process of erection. The old holder capacity is 200,000 cubic feet. Contracts for a four-lift holder of either 3,500,000 or 4,000,000 cubic feet capacity will be awarded at once. The company own in fee simple an area of 250,000 square feet and they hold an option on several acres additional. Land in their vicinity is so cheap that they are virtually unrestricted in their powers of expansion. In this city, for the purpose of carrying out their work, they have purchased seven lots at the foot of 71st Street. By May 1st the new plant will be making gas for local supply.

The gas is to reach New York by a tunnel under the East River, to the details of whose construction our illustrations are more particularly devoted. It runs in a straight line across the East River from the foot of 71st Street to the site of the works on the banks of the East River, nearly opposite thereto. In its course it goes under Blackwell's Island. The rock penetrated has been exceedingly solid, consisting of gneiss, of a most excellent description for tunneling.

The section of the tunnel shows a straight-sided structure 8 feet high and 10 feet in diameter, with arched roof, whose general contour is shown with dimensions quoted. The tunnel is to accommodate three lines of cast iron pipe, one of 48 inches and two of 36 inches each, arranged as shown. Taking the length of the tunnel as 2,400 feet, this, by the ordinary approximate rules of the gas engineer, gives a carrying capacity of 286,000 cubic feet per hour at  $\frac{1}{2}$  inch pressure.

Our sectional illustration of the tunnel route gives an excellent idea of the general distribution and level thereof. The drainage, it will be seen, runs all to one end, where a sump is placed to collect any inflowing water. But the use of the tunnel is not only for three lines of gas mains. The company have already been offered \$10,000 a year, for a period of twenty years, for the privilege of a pneumatic tube. It is also among the immediate possibilities that the East River Gas Company may, in accordance with its charter, develop into a great generating company for gas and power of all kinds, notably for illuminating gas and electric power. The immediate idea is, if possible, to sell gas to existing companies in the city or to acquire the property of those companies. The effects of such operations would be that the storage and use of naphtha within the city limits would be stopped. This in itself is a consideration of great importance.

The city gas companies own a great quantity of real estate. All of this now used by the gas generating works could be sold. As it happens, this part of

the property is the most valuable, as it fronts on the water, and the less valuable portion of the property, remote from the water front and containing the gas holders alone, would have to be retained. The concentration of gas manufacture in a single place would, of course, cheapen its production by reducing the salary list. The proximity of the works to the works of the Standard Oil Company enables them to receive their naphtha by a pipe line, and presumably to make very advantageous terms for its supply.

**The Panama and Nicaragua Canals.**

While the papers have been publishing full accounts of the Panama Canal scandal, and friends at home have been suffering from the bitter cold weather, we have been visiting the Panama Canal and also the Nicaragua Canal and have been uncomfortably warm.

Landing at Aspinwall, or Colon as it is more frequently called, one finds more activity than was to be expected under the present state of affairs. The sun beats down with never-ending energy, and the frightful heat is only partially relieved by the cooling effect of the northeast trade wind.

The influence of this wind is felt only in the northern end of the town, and is completely lost on arriving at the central and southern portions of the level plain on which the city is built.

Work on the canal being at a standstill, the city derives little support from it. Most of the inhabitants get their living by handling the freight that arrives here for shipment across the isthmus to Panama and the return freight. The railroad connecting Colon and Panama is running, but not with the energy it had when work on the canal was in progress. There is but one passenger train per day, and few are the freight trains.

Colon has been twice nearly destroyed by fire, and these fires have had a cleansing and improving effect. The city is cleaner, healthier, better built, and in every way more habitable than formerly, and a citizen remarked that he thought it would be a good thing if the city would burn down about once in five years. There is no street-cleaning commission and no health board, and little is done to keep the health of the people. The arrangements for the care of the sick, however, seem to be very complete. The railroad company has a well-built, well-equipped, and well-managed hospital in the healthiest and most salubrious place on the north shore.

All along the route of the canal quiet reigns. A few years ago there was no Sunday there, but now every day seems a Sunday. It is not true, however, as some would have us believe, that everything has been neglected and allowed to go to the dogs. Allowances must be made for the effects of climate and the peculiar condition of affairs, and when that is done it is surprising how successfully cared for have been the houses, the machinery, the boats, and in fact the entire plant of the canal company. To be sure, one sees much rusty iron, but the important machinery is protected and preserved by careful keepers or watchmen in the employ of the canal company. The tow boats, launches, lighters, etc., are housed in and protected from the weather, their machinery white-leaded and oiled, and periodically overhauled, turned over, and kept in such good order that I doubt not that ninety per cent of these boats could be put into service inside of a week. The houses are in good condition, though the hot and damp atmosphere has caused the usual decay of wood work, notably of the porches and exposed parts. The excavated portions of the canal are filling in, but not to an extraordinary degree. The heavy fall of water during the rainy season has washed down the banks and there have been numerous land slides, but not even to the extent that was expected by the projecting engineers. The receiver in whose hands the canal property now rests is expending about thirty-five thousand dollars a month in preserving the plant. Much interest is manifested by all classes at Colon in the development of the Paris scandals. The Colombians believe in the ultimate success of the canal, and, as they derive a large revenue from the building of the canal and from those employed by the canal company, they are anxious to have work recommence, and it is safe to say that the government authorities of the republic of Colombia will do everything in their power to help the canal company to its feet. It will be some time before the fate of the Panama Canal is decided. In case work is resumed, it will be on the plan of a lock canal.

The original plan was a failure because of inadequate knowledge of the country, incomplete surveys, wrong estimates and ruinous sub-contracts, and last, but not least, corruption.

The engineering difficulties of the new plan may be mentioned as the Culebra cut, the Gamboa dam and the control of the Chagres River. The most important one of the above is the dam, which is to contain 3,000,000 cubic yards of filling.

Those in position to know, and well-informed men generally, place the probable cost of completion at not less than \$125,000,000 and the time at not less than seven years.

Leaving Colon, a couple of days' sail put us at Greytown, Nicaragua, the eastern terminus of the Nicaragua Canal. The advantages claimed for this canal over its rival at Panama are, first, the greater ease of construction; second, its more northern position; and third, the climate and prevailing winds are more favorable. The mechanical details are simpler and its position makes a material saving in distance between New York and San Francisco.

A great deal has been said about the harbor of Greytown being better than that at Colon or Panama. On visiting these places one fails to find it true. It is true, however, that Greytown has a fine large harbor, but the sea has built a ridge of sand which incloses the harbor, thus forming a large lagoon. A pier or breakwater has been built, running out normal to the coast, and to the westward a channel or entrance to the lagoon has been dredged. The breakwater is now about one thousand feet long and is composed of creosoted piles. This, however, is only a framework, temporary on account of the destructive *teredo*, and is to be filled in with natural and artificial rock, part of which is already in place. To the eastward of the pier the shore line has made out about seven hundred feet. The channel to the westward does not get as much scouring out as was hoped for. There is ordinarily about eight feet of water on the bar. The breakwater will probably have to be continually extended, and constant dredging will be necessary to keep the entrance to the harbor in passable shape.

Work was commenced on the Nicaragua route about five years ago, and the progress has been good. Necessary buildings have been built in the most economical style, stores for material established, machine shops started, dredges, tow boats, and barges bought and put to work, and a short line of railroad constructed.

On a hand car we took a run over the railroad, which is now nine miles long. One is struck with wonder while looking at this piece of work, and cannot help admiring the pluck and perseverance of the builders. The road runs parallel and close to the canal line. It runs through a swamp land, and, when they started to build it, there was nothing but a dense forest of trees and undergrowth, the ground being covered to a depth of four or five feet with stagnant water, saturated with decayed vegetation. Men stood in this water up to their shoulders and laboriously chopped and felled the trees. Many of these trees were of wood as hard and unimpressionable as iron. A strip of swamp land was cleared to a width of about eighty feet and for a distance of six miles. The trees were trimmed and then formed into a cribwork along the line of the road, and on this cribwork stringers, ties, and rails were laid. Sand from the dredges was dumped on this, packing down through and around the timber, thus forming an embankment. Where the embankment sank down into the mire of the swamp, more timber and sand was added. Thus was made the roadbed that many engineers said was impossible of construction. The cost was forty per cent less per mile than the original estimate. This road is to be used in transmitting material, tools, equipments, etc., to different points along the line of the canal.

The two large dredges, the City of Paris and the City of New York, have started on the work of dredging, and have cut since January, 1891, a channel 1,500 feet long, 280 feet wide, and 20 feet deep. The track of the canal has been cleared of trees and underbrush for eleven miles. The manner in which one of these dredges eats into the earth is astonishing, and perhaps the reader can form an idea when I say that in each minute fourteen buckets full are scooped out, each bucket holding a cubic meter. Imagine a block of earth nearly as large as the room in which you are sitting being removed in a minute, and then imagine that operation being repeated every moment of the day and night.

A telegraph line has been constructed, so that there is communication all along the line of the canal, through to Brito, on the Pacific coast.

The total length of the canal route is 169.5 miles, of which 142 miles are free river and lake navigation. Lake Nicaragua, the highest level, is 110 feet above tide water.

Estimates made by reliable disinterested men and engineers put the cost of completing the Nicaragua Canal at \$100,000,000. The route has been very thoroughly surveyed, and the above estimate is thus based on comparatively reliable data.

The present outlook for the completion of the Nicaragua Canal is far better than for the Panama, but they both seem to be hipped in the same way. It is simply a question as to which company can first get the necessary funds. F. R. BRAINARD, U. S. Navy.

**Elixir of Cascara Sagrada.**

Dujardin-Beaumetz (*Gaz. Gynecologique*) recommends the following as a remedy for constipation: Fluid extract of cascara sagrada, 90 gm.; pure glycerine, 90 gm.; alcohol of 90 per cent, 200 gm.; simple sirup, 400 gm.; oil of orange, 6 drops; oil of cinnamon, 2 drops; and sufficient distilled water for 1 liter. Dose —a wineglassful after meals.—*Am. Pharm. Jour.*

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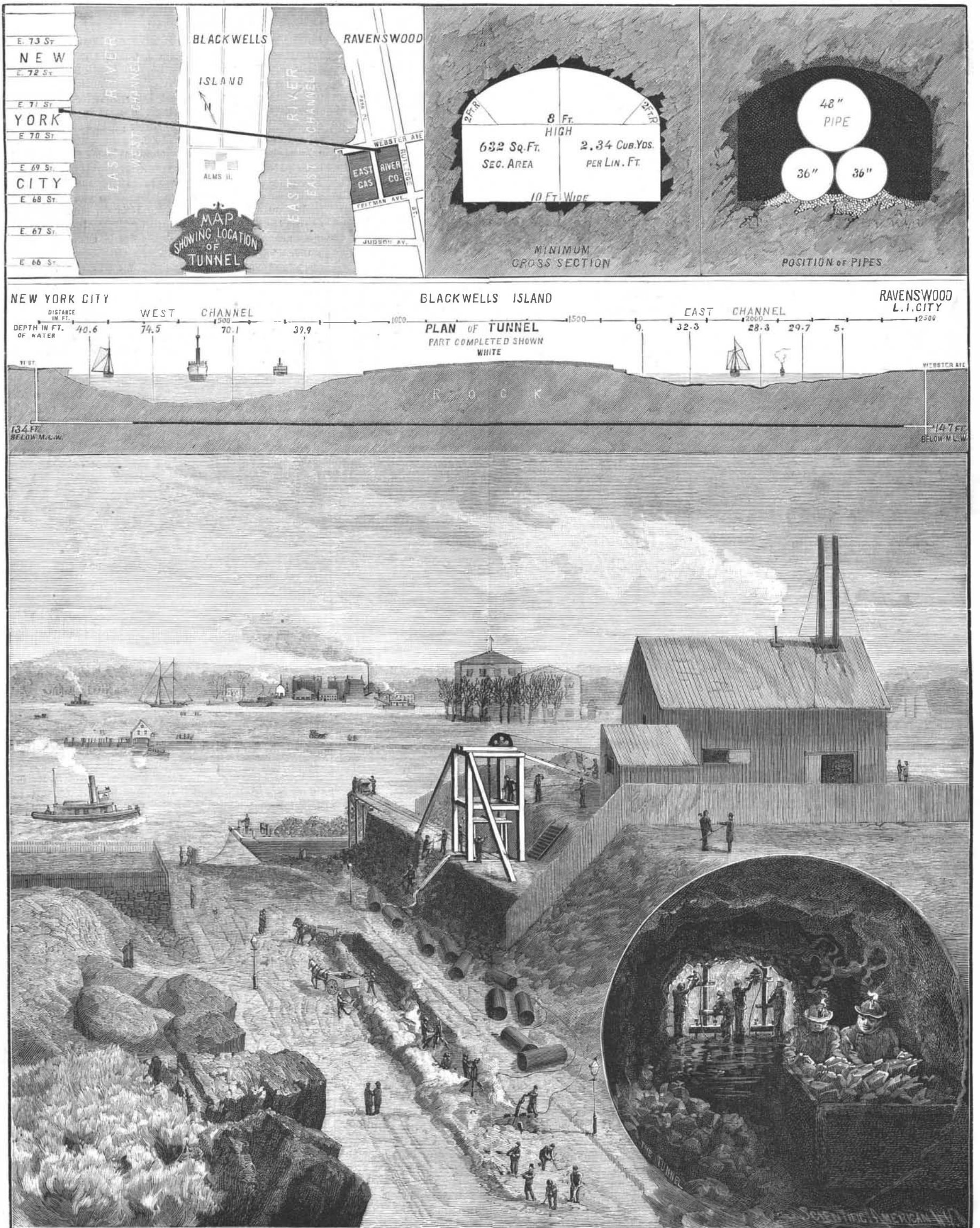
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NEW METHOD OF GAS SUPPLY FOR NEW YORK CITY. SHOWING TUNNEL UNDER THE EAST RIVER.—[See page 119.]