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cavating and filling in, but the embankments will retain their natural height as near as possible, so as to avoid unnecessary labor. The depth of water way is twenty feet, the inside embankment rising four feet above the water and sloping one and a half in one. The entire surface of the two sections will be covered with water-tight puddling two feet in thickness, which will extend underneath the sloping embankment and rise horizontally beyond it to a height of one foot above the highest water line. The puddling thus forms a perfect basin of itself, the horizontal edges or walls being twenty one feet high and six feet in thickness These walls are enclosed in the upper or outer embankment. The sides of the inner slopes are also puddled two feet thick, so that we have, as it were, two basins of puddling, one inside the other, obviating any possibility of leaking. The inner slopes are covered with stone work twelve inches in thickness, laid on the puddling with hydraulic cement. On the Cypress Hill plank road a substantial wall of rubble masonry, faced with dressed masonry, is to be laid along the front of the grounds, to sustain the embankments; it will have a cut stone coping, surmounted by a substantial wrought or cast iron railing, eight feet high. Around the other portions of the grounds a substantial ornamental iron fence, eight feet high, will be built on stone foundations. A gate and keeper's house will shortly be commenced, as soon as the present works are in a somewhat more forward state.

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The water enters at the south end of the reservoir at the division embankment. A stone chamber admits of filling either or both of the divisions, as required. The outlet is at the north end of the embankment, and similar in construction to the inlet. The affluent gates are to receive three distribution pipes, each 36 inches in diameter, but only one of these will be required at first.

The entire arrangement of this reservoir, as also of the pumping engines, is under the direction of Samuel McElroy, Esq.

DISTRIBUTING RESERVOIR ON PROSPECT HILL.

A second distributing reservoir is to be constructed on Prospect Hill, at an elevation of 175 feet above mean tide. It will also be divided into two apartments, arranged for 20 feet depth of water way, containing, when full, over 20,000,000 gallons. All the arrangements are similar to those of the Ridgewood reservoir.

The daily supply of water in Brooklyn will be 40,000,000 gallons, which, with a population of a quarter of a million, gives 160 gallons per diem to each individual. The Croton supply in New York is 17,000,000 gallons; or about 22 gallons per head. The pressure of the water in Brooklyn will be much greater than the Croton, the fall averaging in the former city 115 feet, whilst here it seldom gets above 35 or 40 feet. In many localities in New York a sufficient supply can never be obtained, owing to the lowness of the reservoir and its small capacity; so that we may expect, before many years roll by, to be under obligations for part of our water to Brooklyn.

PRESENT STATE OF THE WORKS.

The distributing or Ridgewood reservoir, the conduit line to Jamaica creek, and Baiseley's storing reservoir, have been for a considerable time past under contract, and are now approaching completion.

Contracts were issued for the canal line and two more storing reservoirs. Contracts are in hand for all the cast iron pipe and castings required for the work, the various quantities amounting to 25,000 tons. The contracts are held as follows:—

Burlington and Florence Foundry, N. J.	10,000 tons.
Plymouth Foundry, Phila.	3,000 "
Warren Foundry, near Easton, Penn.	2,500 "
Millerville Foundry, N. J.	2,700 "
Phœnix Iron Works, Glasgow, Scotland	6,800 "

Three thousand tons of this iron will be received monthly during the next six months, at the company's wharf, where ample arrangements have been made for unloading it. Contracts are about being signed for laying the pipe; this laying will commence on the 20th inst., and be nearly or quite completed next fall. The pumping engines are to be put in hand immediately, and one of the two will be ready for use by April 1, 1858.

* * * * * * *

The following well known gentlemen were appointed by the late Legislature as the commissioners for this great work. Politics have had no influence in the choice, and they receive no remuneration whatever for their invaluable services. *Amor patriæ* is a greater incentive than *amor nummi;* or it ought to be.

BROOKLYN WATER COMMISSIONERS.

John H. Prentice, James Carson Brevoort,
William Wall, Nicholas Wyckoff,
Daniel Van Voorhis, Thomas Sullivan,
Nathaniel Briggs.

The chief engineer is James P. Kirkwood, Esq., and the assistant engineers Messrs. Moses Lane and Samuel McElroy. We are much indebted to Mr. Lane for the day passed in explaining to us everything in relation to the works, and his kindness in not allowing the minutest details to escape us.

The expense of the entire plan will be $4,200,000, the contract being held by the eminent firm of Henry S. Wells & Co., whose services in railroad construction throughout the States, and particularly in the Erie Railroad, are well known, and furnish sufficient guarantee for the success of the present work.

Nothing has hitherto stood so much in the way of Brooklyn's prosperity as the want of water. When this undertaking is completed, real estate will increase largely in value, and the rates of insurance decrease, besides offering inducements to families to reside there, which they care now not to do, whilst our own city has so admirable a water supply. It is to be hoped that the Brooklyn people will not commit the egregious error of constructing the open canal in place of the closed aqueduct: such a mistake would ruin the entire plan. What an awful calamity it will be for a city of a quarter of a million inhabitants to wake up some morning after a heavy fall of snow and find itself without water!

Water Statistics.—We give below the operations of the various waterworks in Philadelphia for the quarter ending March 31st:—

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		Wine gall's
Fairmount works,	January,	173,925,333
" "	February,	174,876,454
" "	March,	172,854,350
		521,656,137
Delaware works,	January,	48,475,925
" "	February,	52,299,724
" "	March,	59,822,406
		160,598,055
Schuylkill works,	January,	82,451,260
" "	February,	95,171,840
" "	March,	97,352,160
		274,975,260
Cornish engine,	January,	43,751,180
" "	February,	47,596,816
" "	March,	60,370,972
		151,718,968
Total,		1,108,948,420

Making the daily average of consumption from these works of 12 321,649 wine gallons.

The operations of the Twenty-fourth Ward Works was as follows:—

24th Ward works,	January,	6,525,630
" "	February,	5,558,670
" "	March,	7,009,470
		19,093,770

The daily average being 212,153 wine gallons.

LATERAL CANALS.

To connect the various ponds, or supply reservoirs; with the main canal, the beds of the various outlet streams will be properly cleaned and graded, and the sides embanked, so as to form lateral canals. It is not necessary to give details as to the various bulkheads and weirs required, as our description of the works is intended for the general reader rather than for scientific persons. It is only necessary to say that all the plans and specifications have been submitted to and met the approval of A. W. Craven, Esq., the Engineer of the Croton Department of our city.

The contract for the construction of the main and lateral canals is not yet made, and it will be well that the Brooklyn Water Commissioners and Common Council reconsider that portion of the work. It is possible that the city of Brooklyn designs to construct an open canal for the conveyance of the water part of the distance, and a covered conduit for the remainder. The objections to such a plan are innumerable, and the only argument in its favor is the saving of some $400,000. The canal is calculated to supply 40,000,000 gallons daily, at a velocity of one-third of a mile the hour, yet it is generally known that rivers freeze with a current of two miles per hour. Ice; however, is not so great an objection as snow; and nowhere are snow storms heavier or drifted more frequently than on Long Island. The great loss of water from evaporation will more than balance the interest on the cost of a covered conduit, whilst the canal is liable to be filled up with snow, sand and other matter along its course, necessitating the expense of constant cleaning. Earth and sand, by diminishing the depth of the water, will not merely decrease its supply, but afford growth to grass and lilies, which will impede its flow. Water fowl will make it their home, and frogs, fish, lizards and eels, with snakes and turtles, will soon sport about in it, and, as is invariably the case, dead dogs, cats and other small animals will be thrown into it by thoughtless or designing persons. The banks thrown up on either side, in consequence of the excavations cannot grow grass under two years; the very fine white sand will roll down their sides and make short work of the canal.

The authorities of Brooklyn allow the advantages of the conduit, but state that in constructing it nine years hence, instead of now, they will save some $400,000 in interest: in other words, they consider that $400,000 *in prospectu* counterbalances the certainty of a stoppage of the water by snow in winter, and a constantly decreasing supply in summer, through evaporation and sub-aqueous vegetation. The engineer of the company is unfavorable to the open canal, but the authorities stick to their money-saving argument, although the construction of the covered conduit will not increase the original estimates (with canal) more than one-fifth. Such "penny wise, pound foolish" policy is incredible in a city so rich and so free from debt as Brooklyn.

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THE CONDUIT.

The covered conduit extends from Jamaica Creek to the distributing reservoir, Cypress Hill—a distace of five miles and a half. The work is cut up into eight sections, let out in as many contracts, all more or less in a forward state of progress. The following is the size of the conduit as compared with the Croton:—

Croton aqueduct	7 feet 5 in. wide.
Brooklyn aqueduct	10 feet wide.

Sections 5, 6, 7 and 8 are in a very forward state. In the first mentioned the section is graded, the stone walls up, and on Wednesday last they were preparing to lay concrete for the inverted arch. In section 6 the concrete foundation is being laid, and masonry was commenced on the above day. Section 7 is the most advanced of all, the aqueduct being complete in one part. The process of construction is as follows:—The excavations being made to the required level, the line is graded, and a water tight foundation of concrete is laid fifteen feet wide. Abutment walls of rubble masonry are then built; these walls are 30 inches wide at base, and 20 inches at the spring line of the upper arch; they are of uniform height, and between them is an inverted arch of brick masonry four inches thick, with a radius of 18 feet, laid on a full bed of hydraulic cement. A brick lining of the same thickness, four inches, is made against the interior sides of the abutment walls, reaching to the spring of the upper arch or covering. This arch has a radius of five feet, and is of brick masonry one foot thick; when finished the entire conduit is covered on the outside with hydraulic cement, and an embankment raised over it to a height of four feet from the level of the adjacent ground, and this is finally sodded, making a handsome and picturesque "mossy bank." It is unnecessary to refer to ventilators, man holes, weirs and culverts, all of which are plentifully provided.

The last mile of the conduit (sec. 8) and the one nearest the distributing reservoir, has some hard work upon it; excavations have been made there to the depth of 37 feet. The stone is brought mostly from Greenwich, Conn., but some comes from Tarrytown. 3,000,000 of brick are used on this section, 15,000,000 to the entire conduit; they are brought from Haverstraw, Croton, Grasspoint, Cattskill and Coxsackie.

THE ENGINE HOUSE.

The western end of the conduit is situated 3,300 feet from the great distributing reservoir, and 165 below it, so that the water will have to be forced up into the basin. This will be effected by means of two pumping engines, each of a capacity sufficient to pump 10,000,000 of gallons 170 feet high, in sixteen hours, the forcing pipes or mains to the reservoir being three feet in diameter and of enormous strength. These engines will be put in hand immediately. Preparations are now being made to erect the various buildings requisite in this department. They will consist of an engine house 100 feet by 60 feet, and a height of 45 feet, with a boiler house nearly the same size. There are other buildings in connection with them, which will form the subject of a report at such time as they are in progress.

THE GREAT RIDGEWOOD RESERVOIR.

This immense undertaking is now in a forward state, and will be completed during the present year. It is situated near to the Cypress Hill Cemetery, from which it is separated by a deep valley. From the works now going on a splendid view can be obtained of Jamaica, Rockaway, Coney Island, Sandy Hook and intervening country. The plot of ground on which the reservoir stands is forty-eight acres in extent, the reservoir covering twenty-six acres and capable of holding 167,000,000 of gallons. It will be much larger than any other in the States, as can be seen by the following table:—

DISTRIBUTING RESERVOIRS IN THE UNITED STATES.

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Reservoirs.	*City.*	*Gallons.*
Ridgewood	Brooklyn	167,000,000
Tivoli	Albany	40,000,000
Bleecker	Albany	30,000,000
Fairmount	Philadelphia	26,900,000
Murray Hill	New York	21,000,000
Buffalo	Buffalo	18,000,000
Alleghany	Alleghany City	10,000,000
Spring Garden	Philadelphia	9,800,000
Delaware	Philadelphia	9,300,000
Hartford	Hartford	8,000,000
Detroit	Detroit	7,600,000
South Boston	Boston	7,500,000
East Boston	Boston	5,600,000
Cincinnati	Cincinnati	5,000,000
Beacon Hill	Boston	2,600,000

In shape the Ridgewood reservoir is an irregular hexagon, the natural form of the basin, or hollow, being retained. It is divided into two sections, one being two-fifths and the other three-fifths of the whole. The bottoms of both are being reduced to a uniform level by ex-

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THE BROOKLYN WATER WORKS.

The Great Ponds—The Open Canal and Objections to it—The Conduit—The Largest Distributing Reservoir in the United States, &c., &c.

The water works for the supply of the city of Brooklyn have been in process of construction during a year, and are now in a sufficiently forward state of progress to give an exact idea of what they will be eventually. Nothing could better show the ignorance of New York with regard to her sister city than that no notice has hitherto been taken of this immense work; and the citizens of our city, who are so justly proud of their Croton Department, will be astonished to hear that Brooklyn will, ere long, have not merely a far larger supply, but will be enabled to furnish the lower part of New York city with much advantage over its present supply, both as regards effective head and annual cost.

The principle of supply in these new works is different from all others, and therefore may excuse the question which is continually asked by New Yorkers, "Where are they going to get their water?" A chain of hills runs through the centre of Long Island, and the country slopes down on each side. All the water which falls or rises on the eastern side of this backbone percolates downwards towards the ocean, but is caught up in its course by a number of pools, or, rather, small lakes, which lie almost in a direct line parallel with the eastern coast. Not one of these ponds is situated more than sixteen feet above mean tide, and they lie over a distance of sixty miles. Only six of them will be used for present demands, but additional supplies can be added from time to time, to any extent, by connecting other ponds.

In order to give the fullest description of the entire works it will be necessary to examine the various stages, in the following order:—The sources of supply—the ponds; the canal connecting the various ponds; closed conduit from the canal to engine house; the distributing reservoir; the distributing mains to city.

The ponds from which the present supply of water is to be obtained are known as follows by the inhabitants of Long Island:—

Baiseley's,	covering	37 acres.
Nostrand's,	"	10 "
Simonson's,	"	18 "
P. Cornell's,	"	25 "
Pine's,	"	10 "
L. Cornell's,	"	22 "

Thus furnishing supply reservoirs of 122 acres. The entire country in the neighborhood of these ponds is covered with running streams of pure water and bubbling springs, as though it had once been an immense lake. Several of these streams are of considerable extent, falling into and becoming the principal feeders of the ponds. Jamaica creek runs into Baiseley's; Springfield creek into Nostrand's; Westbrook creek into Simonson's; Eastbrook or Watt's, into P. Cornell's; and Parsonage into L. Cornell's. The water is of delicious purity; in that respect surpassing even our boasted Croton. Hitherto, the ponds have merely been used for mill purposes, and the bottoms have become covered with alluvial and vegetable deposits, which it is necessary to get rid of. We will give a description of the present state of Baiseley's pond, which will serve as a sample to the rest, as also in respect to the operations being carried on in preparing it for public use.

Baiseley's pond, situated at a short distance from the town of Jamaica, covers an expanse of 37 acress, and the water varies in depth from two to six feet, according to the collection of what looks like black mud at bottom. The water is now all drawn off, and were it not for the mud the spectator would behold a long, narrow basin of clear white sand, nowhere deeper than eight feet. The bottoms of all the ponds for a distance of sixty miles are similar, forming a collection of admirable natural filterers, and justifying the observation of a sententious Long Islander, that "it was very thoughtful of nature to put such good drinking bowls near to the city of Brooklyn." The numerous springs and streams running into the pond have carried along a quantity of vegetable and other matter, which lies on the bottom in thicknesses of eighteen inches to seven feet. We examined this deposit and found it to be peat, which, when dried, would serve admirably as fuel. It can be cut out in square blocks, so great is its consistency, except on the upper surface, where it is more like black slush. This pond will be entirely cleaned out by next October, and earlier than that even, had it not been for the late severe rains, which impeded operations.

Although the supply of water will be much greater for Brooklyn than the Croton department gives to New York, the cost will only be about one-third, and the reason of this is that in the former case advantage is taken of natural facilities, and the immense structures of masonry dispensed with. Thus the natural form of Baisley's and other ponds will be retained, as also their present levels, whilst the shore embankments will be generally adapted to the present flow line. These embankments will be determined in a line two and a half feet above the water way, eight feet wide at top, with slopes of one and a half to one. The embankments of dams will be raised four feet above water level, fifteen feet wide at top, with slopes of two to one. They will be compactly built, in layers, with a central puddle wall, four feet thick, rising one foot above the water line. Wooden bridges will cross the various supply inlets or streams feeding the ponds. Gate houses of brick masonry will be attached to each; that at Baiseley's one story high, forty feet long by twenty-five feet, and the walls twelve inches thick and containing all the necessary appurtenances. A keeper's house will be also attached to each pond.

THE CANAL.

The various ponds or supply reservoirs will be connected with the covered conduit by means of an open canal some eight miles in length, which, at its commencement, will be five feet broad at bottom, increasing to seven and a half feet, so as to receive additional supplies of water on its course towards the city. It will furnish 40,000,000 gallons daily. The bottom and sides will be puddled not less than twelve inches thick, and will have a grade of two inches to the mile. The berme banks are to be seven feet high above grade, six feet wide at top, with side slopes of one and a half to one; berme, drains three feet wide and one foot deep in excavation, discharging into waste weirs so as to prevent surface water entering the canal. Where road bridges are required, of which eighteen are proposed, the abutments will be three feet thick and the walls of rubble masonry faced with dressed stone-work. Each bridge will be at least 18 feet wide, the flooring of planking, and a strong ornamental hand rail on each side. About thirty three farm bridges will also be built, finished in a similar manner.

The waste weirs along the canal are to be five in number, with abutments not less than 30 inches thick, built on solid concrete foundations, protected with sheet piling of rubble masonry; the splayed wing walls faced with rock dressed masonry, with cut stone coping. The outside slopes of the canal will be turfed, or rather seeded, and a substantial picket fence, eight feet high, will enclose the property.