HISTORY

OF

ESSEX AND HUDSON

COUNTIES,

NEW JERSEY.

COMPILED BY WILLIAM H. SHAW.

ILLUSTRATED.

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The quarry is reached by going up Mt. Pleasant Avenue till the foot of the steep part of the mountain is reached, and then turning off to the left in a wagon track, which leads into the quarry two hundred or three hundred feet.

GEORGE H. COOK.

NEW BRUNSWICK, N. J., Sept. 24, 1884.

Mr. Toombs, editor of the *Journal*, has this to say of this natural geological curiosity:

The discovery of a remarkable exhibit of basaltic columns, on the Orange Mountain, is attracting wide attention, and it is indeed one of the greatest natural curiosities in the country. Visitors to Europe go out of their way many miles to view the Giant's Causeway, in Ireland, and this new discovery reveals a curiosity superior in the size of the columns and in beauty of formation.

Pleasant Valley.—F. W. SHRUMP'S QUARRY,[1] located between the First and Second Mountains, near the township line, between Caldwell and West Orange, also in the face of the Second Mountain, was opened in 1871, and about two acres have been worked over. At the northwest it is fifty-five feet deep, and at the top there is a sandy earth and then a shaly rock, in all, twelve to sixteen feet thick, which has to be removed to get at the workable beds. These are a grayish-colored, rather coarse-grained stone, in thick beds, and under them there is ten feet of red, fine-grained sandstone, suitable for rubbing and polishing. The same rock is in the bottom lead where the quarrying stops, and the same kind of rock is reported to have been met with in sinking a well thirty-five feet lower, at a house a few rods from the quarry. The dip is 10° westerly; the joints are clean, and one system, very regular and continuous, runs vertical, with 70° west; the other at right angle to it, and also vertical, is not continuous throughout. By means of these divisional planes or *backs* and *headers*, the stone is easily quarried, and large sized blocks are obtained. Blocks thirty feet long, eleven-and-a-half feet wide and ten feet thick, have been taken out, and stone twelve feet six inches long, eight feet six inches wide, and two feet eight inches thick have been removed.

The hoisting and loading is done by a ten horse power engine working a derrick, when the stones are carted to the Morris Canal, two-and-half miles distant, and to the railroad at Montclair and Orange, points about equally distant. New York is the principal market, though much stone from this quarry has been been put into churches and other buildings in the vicinity. The Caldwell Presbyterian Church, the Reformed Church, in East Orange, and the additions to Grace Protestant Episcopal Church, are built of stone from this quarry. The prices range from ten cents to one dollar and twenty-five cents per cubic foot, according to quality.

[1] Cook's Report, 1881.

CHAPTER VII.

WATER SUPPLY OF ESSEX COUNTY FOR DOMESTIC USE.

Newark Water Supply.—Aqueduct water was introduced into Newark as early as the year 1800, being supplied to houses through wooden pipes. The Newark Aqueduct Company was incorporated November 17th, 1800. The first directors were John N. Cummings, Nathaniel Camp, Jesse Baldwin, Nathaniel Beach, Stephen Hays, James Hedden, Jabez Parkhurst, David D. Crane, Joseph L. Baldwin, Luther Goble, Aaron Ross, John Burnet and William Halsey. In 1828 steps were taken which resulted in the substitution of iron for wooden pipes. Under an act of the Legislature, approved March 20th, 1860, "The Newark Aqueduct Board" was constituted, and by that authority the transfer was made to the City of Newark "of the capital stock and all the rights, franchises, lands and property, real and personal, of the Newark Aqueduct Company," the consideration being $100,000.—*Atkinson's Hist. Newark, p.* 190.

Driven wells were also tried by the Newark Aqueduct Board, near their pumping station above Belleville, in the alluvial sand and gravel on the west bank of the Passaic. A large number of them, about forty, were driven to depths varying from forty to forty-eight feet, and they yielded to steady pumping nearly one hundred thousand gallons each per twenty-four hours. The tubes reached between thirty and forty feet below tide level, and the water in them rose and fell with the rise and fall of the tide, though not to the same extent.

The water was probably Passaic River water that had filtered through the sand and gravel. It was clear, and much more satisfactory to the eye than the unfiltered river water, and was no doubt much safer for domestic use. A very large amount of water could be obtained there by such wells, when driven down so far below the tide level.

The water is raised by means of steam pumps, and forced into reservoirs in the city of Newark, whence it is distributed throughout the city, through about one hundred and forty miles of cast iron pipe, ranging in size from four inches to twenty-four inches in diameter.

Of this water, (Passaic River) the State Geologist, in his report for 1882, says: "The quality of the water in the Passaic above Patterson is good. After it receives the sewage of that city, of Passaic and the smaller towns along its banks, and the filth, impurities and waste from the numerous manufacturing establishments in those places, it cannot but be polluted and rendered undesirable for use. In addition to this, the whole of the sewage of Newark City is poured into the river, and some of it is carried by the flood-tide up

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the stream and directly in front of the pumping stations of Jersey City and Newark. Much uneasiness has been felt in regard to the quality of the water supplied to these cities, and careful analyses of it have been made at various times.

Prof. Henry Wurtz analyzed it, and his report, made to the Jersey City Water Board, was published in March 1873. The report of Prof. Albert R. Leeds, upon the same subject, was made at the same time.

In 1876 analyses were made in the Geological Survey Laboratory of the water taken at various places along the river from Newark up to the smaller branches, of which we give the two in question.

Sources.	Solid matter. Dried at 212° Fah.	Solid matter. Ash after burning.	Solid matter. Volatile and Organic matter.	Chlorine.	Sulphuric Acid.	Lime.	Magnesia.	Date of collection.
Jersey City pump works, high water	15.89	12.21	3.58	5.35	1.03	1.24	0.79	1876. Aug. 31.
Jersey City pump works, low water	6.52	4.52	2.00	0.58	0.48	1.24	0.54	" 31.
Jersey City pump works, hydrant	13.04	10.02	3.02	4.10	0.40	1.19	1.03	" 25.
Newark pump works, high water	9.37	7.36	2.01	3.60	0.83	1.17	0.90	" 31.
Newark pump works, low water	5.85	4.35	1.50	0.25	0.46	1.17	0.51	" 31.
Newark pump works, hydrant	7.52	6.35	1.27	1.46	0.40	1.19	0.70	" 25.

The interpretation of these results of analysis might be made at length, but it is sufficient to say, that from the amount of chlorine, which is the largest constituent of salt, in the waters from the Newark and Jersey City works, it is conclusive that salt water from the ocean comes up with the tide and is mixed with river water at the pumping stations, or else there is an enormous amount of that substance from filth and waste animal matters poured into the stream at Newark. It will be seen that the amount is greater at high water than it is at low water, so that it must, in considerable part, be carried up the stream with the tide.

The unusually large amount of volatile and organic matter in the solid substance collected from these waters, together with the knowledge of the sources from whence it is derived, is also strongly against its character and desirability for domestic and household use.

A large number of samples of water from the Passaic at different places from Newark, up to Little Falls, were analyzed in 1881 by Prof. A. R. Leeds. His conclusions were, that much of the filth received into the stream at Patterson, is oxidized and rendered harmless by the oxygen of the air, as the water is flowing from that place to Newark, and that the pollution of the water used for the supply of Jersey City and Newark, was derived mainly from the sewage of Newark, that is carried up the stream with the salt water at every flood tide, and carried directly in front of the pumping works of both cities."

The following are extracts from the Superintendent of the Water Works' report to the Aqueduct Board, for the year ending November 30, 1883.

"The total pumping at Belleville for the past year is 3,530,491,140 gallons, a decrease of 2,767,532 gallons as compared with the previous year. The highest daily average was 10,784,464 gallons in August; the lowest, 8,308,494 gallons in April. The daily average for the year was 9,672,578 gallons, a decrease of 7,582 gallons as compared with 1882. Amount of coal consumed, 4,570$\frac{8}{2240}$ tons.

The total amount of water pumped at the High Service Station is 1,038,420,552 gallons, an increase of 75,080,477 gallons, as compared with the previous year. The highest daily average was 3,338,847 gallons, being an increase of 28,750 gallons; the lowest, 2,376,319 gallons, an increase of 222, 990 gallons. The daily average for the year was 2,844,988 gallons, an increase of 205,700 gallons as compared with 1882. Amount of coal consumed 2,707,664 lbs."

The total amount of pipe laid during the year was 17,599 lineal feet, or 3$\frac{3399}{5280}$ miles, of which 7,299 feet were 30-inch, 285 12-inch, 1,606 feet 8-inch, 2,488 feet 6-inch, and 5,291 feet 4-inch. Stop gates set, 24: five 30-inch, three 8-inch, four 6-inch, and twelve 4-inch. Length of pipe connected with the Works, 143$\frac{3337}{5280}$ miles.

New hydrants set, 10. Five hydrants in Market street were taken out and replaced by 6-inch, double nozzle, R. D. Wood hydrants."

Officers of the Newark Aqueduct Board, 1884. Henry Lang, Mayor, President; Frank W. Meeker, Secretary; William E. Greathead, Superintendent.

COMMISSIONERS ELECTED BY THE PEOPLE.

Thomas Harlan, Frederick Heller. Terms expired 1883.
Lott Southard, M. D., James R. Smith. Terms expired 1884.
John Illingworth, Ferdinand H. Wismer. Terms expire 1885.

Artesian Wells.—In Newark, the large consumption of water by the extensive manufacturing establishments of the city, has stimulated the search for cheap and abundant supplies of water in the underlying red sandstone strata, and several wells have been put down, which are successful in affording the needed quantities. From the Geological reports of 1879, we make the following selections.

"The well of Messrs. E. Balbach and Son's smelting and refining establishment, in Newark, is located near the Morris Canal, and only a few feet above tide level. The well is five hundred feet deep, of which one hundred feet was through sand and gravel, and the rest is red sandstone rock. It has an eight inch tube down to the rock, and the water rises in it to a little above tide level. The water is very clear and a little hard, and has a temperature of 55½° Fah. The well yields five hundred gallons per minute, and when pumped at that rate, the water surface in the well is lowered six or eight feet. The ground around the well is dug away so as to allow the pump set within two feet of the surface of the water.

The water is used for all purposes about the establishment, but is specially valued for its low temperature, and its usefulness in cooling the heating furnaces."

"The well of Messrs. P. Ballentine and Sons is at their brewery on Freeman street, Newark, and not far from the well just mentioned, though the ground is perhaps ten feet higher. It has an eight inch bore, and is tubed through ninety feet of earth and ten feet

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into the rock; the remaining three hundred and fifty feet is without tube, being all in red sandstone. The water rises to within twenty-four feet of the surface. The quality of the water is good, being clear and cold. With the pump considerably above the surface of the water, it has yielded two hundred gallons a minute, and will no doubt yield double the quantity when the pump is properly set."

"The well of the Celluloid Works in Newark, is two hundred and fifty feet deep, and yields a satisfactory quantity of water. This water was analyzed by Messrs. Ballantine, and found to contain, in a gallon—

Chloride of sodium (common salt)	0.6 grs.
Sulphate of soda (Glauber salts)	11.7 "
Sulphate of lime (Gypsum)	75.1 "
Sulphate of magnesia (Epsom salts)	18.7 "
Carbonate of magnesia	6.1 "
Silicic acid	2.0 "
Grains of solid matter	124.2 "

"Messrs. Lister Brothers have recently bored a deep well at their works, on the banks of the Passaic, in Newark. It is eight inches in diameter, and six hundred and fifteen feet deep. It was sunk one hundred and ten feet in earth, and five hundred and five feet in rock. The surface is but a few feet above tide, and the water rises to within two feet of the surface. The well is in constant use, and is yielding at the rate of 800,000 gallons of water per day. The water is clear and cold, and the temperature 55½° Fah. An analysis of the water shows it to contain 152.34 grains of solid matter to the gallon. The mineral matter in it is composed of the following substances:"

Sulphate of soda	15.94 grs.
Sulphate of magnesia	25.87 "
Sulphate of lime	106.98 "
Carbonate of magnesia	1.55 "
Chloride of Sodium (salt)	2.47 "
	152.81

"A second analysis of the water from this well, after about six weeks pumping, shows 145 grains of solid matter, and 88.1 grains of sulphuric acid in a gallon, instead of 152.8 grains of solid matter and 89.1 grains of sulphuric acid in the first analysis."

This water was again analyzed at the end of 1882, when it was found to contain 151.79 grains of solid matter to the gallon. After three years steady pumping, it has not changed in quality.

"Sulphate of lime makes a hard scale in steam boilers, and the large amount of it in this water shows it to be unfit for use in steam boilers, or in any apparatus liable to be affected by an accumulation of scale or sediment. Such water is too hard for laundry purposes, and not to be recommended for drinking or household use. In these large manufacturing establishments it is, however, of great value on account of its being always clear and cold, so that it can be used for condensing or cooling hot substances, and for the ordinary washing and rinsing operations where neither heat nor soap is needed. The amount of sulphate of lime in the water from all these deep bored wells which are in red sandstone, is too much to make it desirable for steam boilers. The amount appears to be greatest in that from the deepest wells."

East Orange.—This township, the smallest in area, and the largest for population and wealth of any in the State, is provided with means for a water supply from three bored wells, located on Grove street, about one and a quarter miles north from Main street. The wells are six inches in diameter, bored about ten feet in earth, and the remainder in red sandstone. Well, No. I, is eighty-six feet deep; No. II, is ninety-two feet, and No. III, is one hundred and twelve feet deep. The distances between them are 125 feet and 200 feet; the water rises to within four feet of the surface in No. I, and four and a half feet in No. II, and seven and a half in No. III. For further particulars, see history of East Orange Township.

Orange Water Works.—These works were built in 1882–83, and on February 1, 1884, Mr. W. B. Rider, the chief engineer employed to construct the works, made his final report to the city authorities, who accepted the works, and February 22, 1884, the capacity and efficiency of the works were tested in the city of Orange to the satisfaction of the "City Fathers" as well as the Fire Department and thousands of spectators.

The works consist of a large storage reservoir, with the necessary arrangement of gates, pipes, screens, gate-houses and waste weir; also, a main supply pipe or aqueduct, and street mains, with gates, hydrants and other fixtures.

The storage reservoir is situated between the First and Second Mountain, so-called, just south of the Northfield road, on lands purchased of Henrietta E. Watkins, John Chappaz, Maria Heller, Estate of William Redmond, W. H. & R. Burnett, Bernard Hirtz and Jean LeClere.

The quantity of land taken for reservoir purposes is 100.65 acres; quantity flowed, 65.647 acres. Table of capacity of the reservoir, for each two feet in depth.

	GALLONS.
Capacity available 32 feet in flume	273,953,664
" 30 "	233,718,879
" 28 "	197,111,909
" 26 "	166,208,414
" 24 "	138,813,572
" 22 "	113,813,570
" 20 "	92,280,137
" 18 "	73,001,852
" 16 "	55,517,762
" 14 "	40,739,627
" 12 "	30,127,717
" 10 "	19,829,527
" 8 "	12,391,507
" 6 "	7,378,267
" 4 "	2,340,637
" 2 "	793,740

The capacity of this basin can be increased at a small expense, about two hundred million gallons; making a total storage capacity of about four hundred and seventy millions of gallons.

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