

Supply of Water.

In arranging a plan for supplying our city with an abundance of "pure and wholesome" water, there are four general questions to be settled, which will determine the best "modus operandi." These are the quantity necessary, the elevation or height of reservoirs, the source of supply, and the cost.

1st. The quantity necessary.— It is difficult to determine the exact quantity required for the use of the citizens, the extinguishment of fires, cleansing of streets, fountains, &c., and as all cities are affected by local circumstances, their experience on this point presents a marvellous variety in the amounts consumed; but, direct as they are, the items of the following statement will give us sufficient data for an approximate estimate:—

The average daily supply to each inhabitant\* of the metropolis of London is 4.01 cubic feet, or 31.32 New York gallons; or to each citizen of the city proper 3.21 cubic feet, or 25.67 gallons.

The same daily supply to each citizen of Paris is 3.13 cub. feet; of which 2.97 cub. feet, or 23.17 gal. N. Y., of water from the canal De L'Ourey, are used for the public fountains, street channels, &c.; and the remaining 1.28 gal. of Seine water for cooking and drinking.

The citizens of Greenock, Scotland, each use 2.5 cub. feet daily, or 15.62 gal.

The aqueducts of modern Rome, Aqua Virgini, Felce and Paola, the first being 54 lb Roman miles long, and the second 11.31 miles, supplied daily to about 300,000 citizens 6,375,454 cub. feet, or 94.86 gal. each.

The citizens of Philadelphia use 24.24 gal. daily those of New York 25 gal.; and this consumption will not be exceeded in the city of Boston.

The large supply of the metropolis of London is probably caused by the amount used by its numerous factories and immense breweries. We have that of Greenock as a minimum, and while we should not restrict ourselves to its rigid economy we may safely retrench on the maximum of London. We are satisfied that a daily supply of 25 gal. to each citizen of Albany, would be ample for all contingencies which might arise. We have factories and breweries, and expect the manufacturing interest to increase; but they are not and cannot be, for years to come, London establishments. We will have public fountains and clean streets; but this wastefulness need not impoverish us; and fires will light their midnight torches occasionally, but the presence of a competent or even ordinary supply, ready for use without delay, will prove true economy. Under this ratio, the amount daily required by a population of 45,000 will be 1,125,000 gal.

But we should not confine our estimates to the present. Albany as she is, is not Albany as she will be. Her mercantile importance is constantly increasing, and her progress in the path of prosperity is regular and onward. The smoky wings of desolation may spread over her, and prostrate in an hour her factories and most populous district; but a few weeks pass away, and amid the warring clank of anvils, and blows of re-sounding axes, and the busy hum of concentrated labor, fabrics tenfold more costly and noble, rise up, Phoenix-like, on the ashes of ruins. It is necessary, therefore, to make provisions for the probabilities of the future; but it is also evident that these provisions must have a limit. If, like Boston or New York we were favored with a fountain which would furnish a constant and elevated supply, without the intervention of mechanical agencies, we might provide for all time to come, but it has been ascertained by surveys, that no source of supply is available without the force pump or steam-engine and our calculations may be limited to the duration of such power, viz.—about 20 years. If our city increases in population for this period in the same ratio with its increase from '10 to '15 it will number in 1830..... 49,400  
1845 ..... 61,200  
1860 ..... 76,600  
1875 ..... 95,100  
1890 ..... 121,000

Providing at present for the wants of Albany 20 years hence, it is necessary to command a daily income of 2,025,000 gallons.

2d. The Elevation.—In glancing at the topographical features of the city, it seems apparent that the line of Ten Broeck street across its northern spur, and of Eagle street, across its central spur, form a proper division line of reservoirs, and suggest the idea of two elevations or supplies. The general height of this division line is less than 120 feet above the river, and it is stated in Major Douglass's report of 1846, that three-fourths of the population live below it. The same report mentions that the summit of Washington street is 220 feet above the river.

Three-fourths, therefore, of the whole quantity of water must be used below an elevation of 120 feet, and the remaining one-fourth below that of 220 feet. In order to carry the distributing pipes across the several ravines of the city without diminution of head, and make them valuable to the residences on Ten Broeck and Eagle street in their highest points, an elevation for the main reservoir of 140 feet will be ample; and a like addition of 20 feet will suffice for the upper reservoir. One thing we assume as a certainty that no system of reservoirs can supersede the necessity of a Fire Department. This is demonstrated by the experience of all large cities. It would be easy to effect a communication with the upper reservoir so as to furnish on the line of Broadway a jet of 200 feet, but at the risk of the conduits, and inadequate in quantity for anything but a fountain. All that can be done for the firemen is to give them plenty of water, and this is all that Albany firemen need.

3d. The Source of Supply.

Several years ago, the question of the source of supply created quite a diversity of opinion among our citizens. Many, overlooking the vicinity of home, turned their attention to distant streams. Some yearned for the plunging waves of the Cohoes; some gazed wistfully towards the rock-ribbed breakers of the Hellerberg, and others were clamorous for the creek which flows 'hard by' the Glass House. Within the past year, experiments have been made to test the yield of that plain, which lies on the summit ground, about eight miles west of the city, with a surface of some five square miles, and containing a stratum of saturated quicksand, which evidently supplies the Patroon's Creek and other streams in the vicinity. A report favorable to this source of supply was presented to the New Hydrant Co. by E. H. Smith, Engineer, but the project did not meet the approval of the majority, and if it had we doubt whether they could overcome the legal opposition of Gen. Van Rensselaer to the drainage of his creek.

Actual surveys of Thompson's and Warner's lakes, Batterman's creek, the upper branch of the Patroon's creek, the Mohawk river, and the probabilities associated with the project last mentioned, have left but two important rivals in the field. The Patroon's creek and the Hudson river.

If these were equally pure, perpetual and available, the comparative cost would decide which should have the honor of becoming 'meat and drink' for our good citizens. But examining the former on these points, we find, in the first place, that the wash of the cultivated fields through or near which it flows, makes it turbid and unpalatable after the slightest rain. This difficulty which has excited so much complaint among our citizens who have had a sensible and ocular demonstration of the fact, will increase rather than diminish; and the vegetable and organic matter with which its waters often seem to be impregnated, is no slight objection to its use. There is in the second place, not without foundation, a prevalent doubt of its perpetuity. The cultivation of its banks, or the drainage of a single feeding swamp would materially affect it, and nothing but the strict precautions of its owner has maintained its present discharge. In the event of the Corporation, or any other association, becoming possessors of its waters they would be compelled to purchase the surrounding farms, or make arrangements the same in effect, and comparative expense. But the question of its availability is the most difficult for it to answer. Gen. Van Rensselaer is interested in preserving his creek for the numerous factories it now drives and is to drive, and, though his conduct towards the several companies and committees of the city, has been uniformly generous and obliging, he will expect and ought to have its full value, if it should be segregated to the public use. To this must be added the opposition of the proprietors of mills and factories, and the cost of their rights and privileges, and lastly, but certainly not least, is the agreement held from Gen. Van Rensselaer by the Albany Water Works Company, which is broad enough to shut out all possibility of touching this supply except with their co-operation and consent. But if all these obstacles are surmounted, another serious difficulty arises. This is, that the available head of the creek will not supply an elevation of over 160 feet, which to all intents and purposes is no better than that of 110 feet. The steam engine, so objectionable to some, was considered by both Major Douglass and Joseph Batten a necessary auxiliary to the Patroon's creek project.

Let us turn to the noble Hudson. Is it pure? Not indeed perfectly so, but purer than the famous Schuylkill, or any other large river in the world. The stream upward bound from New York, before the introduction of the Croton, always provided a large supply of it, because it was sweeter and kept longer than any other they could get, and the analysis of the chemist might be cited to confirm their taste. (Considerations of economy may have induced them to take up with inferior water since) Is it perpetual? Even 'as the everlasting hills' Centuries have passed since its majestic course was first directed towards the ocean, and no eye has traced in it the weariness or weakness of age, while that cultivation which drains up the smaller streams, but multiplies and brightens the images which glance from its bosom. Is it available? Let the steam engine answer. It seems peculiarly fitting that man should use the most wonderful invention of art, in making his drafts upon the noblest store of nature, and we think the argument under the next division of our subject will demonstrate the economy of this over all other sources of supply. Even if this were not so, city pride should weigh down a few thousands at least.

4th. The cost.—

A brief sketch of the plans by which these supplies are to be made available, will introduce the items of cost.

Major Douglass, in 1846, proposed to erect a dam on the Patroon's Creek, west of Tyrol Falls and carry the water thence, by a brick culvert, tunnelling where it was necessary, to a main reservoir, situated at the head of the Patroon street pond, and elevated 170 feet above the river.—Where the line of this culvert passed under the high ground at the head of Lumber street, a steam engine was to be erected which should supply from the side-tank, the upper reservoir necessary for the city west of Ten Broeck and Eagle etc., at an elevation of 270 feet. The capacity of these

reservoirs is not stated. The cost of this work is contained in the following estimate.—

400 yds. open cutting, back filling, &c.	\$3,000
Embankments and culverts.....	15,000
1200 yds. tunnelling.....	21,000
1600 yds. brick culvert, 3 1/2 feet.....	64,000
Dam, main reservoir, &c.....	20,000
Steam engine (about).....	31,000
Upper reservoir, stand pipe, &c.....	31,500
Land rights.....	2,000
Engineering and contingencies.....	14,000
\$160,500	

In the summer of 1847, surveys of a similar line were made by J. Batten, Esq., of the new Hydrant company. Probably on account of the location of the Albany & Schenectady railroad track, and for other reasons, the dam was located at the foot of the Tyrol Falls, while the main reservoir occupied the same position as that proposed in Maj. Douglass' plan, with an elevation of 160 feet. The upper reservoir was located at the head of Patroon street, with an elevation of 210 feet, and depended for its supply on a steam engine at the main reservoir.

We have been informed that the conditional contract made by Mr. Batten with this Company, was, for the above work..... \$200,000

Add to this the present value of the creek to its proprietor, which liability is the same in amount, whether paid now, or in future instalments..... 200,000

Rights and damages of factories.....	100,000
of Water Works Co.....	50,000
Contiguous land, for protection of creek.....	10,000
Capital necessary to maintain the annual cost of the steam power.....	40,000
\$600,000	

In availing ourselves of the Hind-on river supply, through the agency of the steam engine, it is necessary that the line of force tubes from the engine to the reservoirs should be as straight as possible. Economy in the service pipes also requires a location for these reservoirs as nearly central as circumstances will permit. We propose, therefore, to locate a sufficient steam power, on the Pier at the foot of Orange street, or, if possible on the main land, above the reach of freshets, and, drawing the water from a filtering stratum to force it up this street, to a point 110 feet above the river, (probably near its intersection with Swan street) where the main reservoir shall be constructed. From thence the force tube will pass up Patroon street, to a point 210 feet above the river, the site of the upper reservoir. The distance of the main reservoir being about 3000 feet, and of the upper reservoir about 7000 feet from the engine station. Nothing but actual survey will determine these points and distances precisely, and we have depended on the reports of Cushman and Douglass, together with information from other sources, scale of maps, &c. for the basis of these statements.

The sites of the Engine station, reservoirs, and line of force tubes, are believed to be particularly advantageous to the purpose in view. The steam power will consist of two expansive, horizontal direct action Engines, each of sufficient power to supply the daily quantity necessary 20 years hence working alternately from week to week. These will each connect with a force-tube of ten inches bore, so that in any peculiar emergency, a discharge of 1,615 gallons per minute may be obtained, a quantity nearly four times greater than can be used at present. Each of these engines being complete in itself, one can be supplied by the boiler of the other, in case of accident to its own, and under similar circumstances, one can use the force tube of the other. Numerous advantages peculiar to this arrangement might be mentioned, but the discussion of their merits will be more proper after the adoption of the general plan. In economy in safety, in power almost unlimited, this system will find no equal. Neither does it restrict us, as to elevation. If 110 and 210 feet are not considered sufficient, we can have, with an additional cost comparatively trifling, 170 feet and 270 feet and all these advantages can be obtained for the following sums:—

Two Engines.....	75,000
Station House and lot.....	1,000
Force tubes.....	21,571
Trenching.....	601
Main reservoir.....	15,000
Upper reservoir.....	10,000
Reservoir lots.....	4,000
Capital to maintain steam power.....	120,000
Engineering &c.....	2,000
\$195,171	

It is not considered necessary at present to enter into a definitive detail of the above items, although it is proper to state that they are all believed to be in excess.

It may be objected to our estimate of the cost of the Patroon's creek project, that for the next 20 years the city will only require at the farthest 2,025,000 gallons per day, while the daily discharge of the creek is 6,548,877 gals. and consequently that this sum is three times too large. We meet this by saying that there are but two ways in which a supply from this source can be obtained—by legal process, which will compel the corporation to take the whole creek and pay for it immediately—or by an agreement similar to, and superseding that of the Water Works Company which will permit them to collect and use the surplus accumulating during the day and night hours of each week. Now it appears by the Report of the Company, published March 20 1846 that this surplus would yield them a daily supply of 1,229,552 gallons—1,175,118 gals. less than is necessary at present, and 1,110,118 gals. less than the requirements of the city in 1860. We do not suppose that the present quantity of creek water furnished the citizens by the Company above mentioned, approximates very nearly to what they expect to be able to deliver. There are other reasons why the corporation cannot obtain one-third of the daily discharge of the Mill creek, which it is not deemed necessary to mention.

The conclusion of argument under the last division of our subject, is summed up thus:—

First cost of the Patroon's creek supply.....	200,000
do do Hudson river.....	125,171

Balances in favor of the latter, for 20 years to come, at least..... \$101,257

We feel that the only apology, which a consummation on a subject of so great public importance as this, needs, is for the imperfection of its sentences rather than the presentation of its facts. It has been deemed unnecessary to cover the whole ground occupied by this question in all its bearings and details, or to spend much time in defending the position assumed at present. We are satisfied that the popular opinion favors the Hudson river supply, and are pleased in being able to show that city pride and true economy can join hands on this glorious and glorious fellowship. If the general outlines of this system are favorably received, it will be easy to perfect and develop its details, and place in the coronet that graces the brow of our noble city, as she rests on her beautiful hills, an inestimable and necessary jewel of the first (rate) water.

MEMORIAL ADDRESS.

This form of expression signifies the whole number of water used for all purposes, divided by the number of citizens.