Compliments of the Chairman

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REPORT

OF THE

BOARD OF HEALTH

TO THE

COMMON COUNCIL OF THE CITY OF TROY,

PRESENTED APRIL 4, 1867.

for 9 mos.

TROY, N. Y.:
FROM THE STEAM PRESSES OF THE TROY DAILY WHIG.
1867.

REPORT.

OFFICE OF THE BOARD OF HEALTH,
TROY, N. Y., April 4, 1867.

To His Honor, the Mayor, and the Honorable the Common Council of the City of Troy:

The Board of Health beg leave, respectfully, to report to your Honorable Body a brief account of their acts during the nine months they have been in office.

The Board is aware that such a report has not usually been required or presented, but as their efforts in carrying out sanitary measures, when unusual disease seemed impending, was watched with unwonted interest by the public, and as they have been attended with considerable expense, they deem it their duty to themselves, that it will be respectful to your Honorable Body, and satisfactory to the people to make a succinct statement, and beg leave to make some suggestions in reference to hygienic and sanitary measures in addition to the report of the Health Officer, which will herewith be submitted.

It will be seen from this statement that the extent of the sanitary survey has been quite extensive and minute, and that many causes prejudicial to health have been removed.

It is true that cholera has not prevailed, nor can it be said that it has been prevented by the efforts of the Board and its officers, but it is undeniable that sufficiently efficient and prompt measures calculated to prevent its occurrence were adopted, and in the cases which did occur to prevent its spreading, even had there been a condition of the atmosphere favorable to its prevalence. The Health Officer with commendable activity and skill, resorted at once to

disinfectants, cleanliness, etc., so that all the cases, except two, were solitary.

Perhaps there would have been sporadic cases without these precautions, but if such fortunate sequences had been observed after similar measures in the city of New York, the sanitarians would have claimed the merit of having "stamped it out."

It will be remembered that soon after the present Board was organized, there occurred a flood unprecedented in violence and devastation—destroying sewers, tearing up pavements and gutters, filling cellars and low spots in the city with offensive and poisonous matter from obstructed sewers, privies, etc. The Board immediately directed the Health Officer to employ a sanitary inspector and such other assistants as the exigencies of the case might require. Energetic and thorough measures were carried out with as much promptness and efficiency, as the difficulty of obtaining teams and men would permit.

There was no unusual prevalence of disease after this flood, nor is the Board aware of many individual cases justly attributable to it.

The Board has examined the mortuary returns of the Superintendent of Public Burying Grounds, of this city, for the nine months from July to March inclusive, for the last seven years, and find that the deaths during the past nine months exceed the average of those occurring during the corresponding months of the preceding six years, by nine. The deaths from small pox, dysentery, diarrhœa, cholera, cholera morbus, cholera infantum, typhoid fever, typhus fever and scrofula, are less than the corresponding average by twelve. They have also figured the number of decedents under five years of age, for the same portions of the same years, and find that during the last nine months there have been fewer deaths by thirteen than the average for the same portion of the preceding six years. If due allowance for the increase of population be made, it will be fair to infer that the mortality from zymotic and infantile

diseases, which arise more than many others from unfavorable hygienic conditions, has been very considerably diminished within the last nine months.

The Board do not presume positively to assume that this improvement has been owing solely to their measures, but are willing to state the facts which have succeeded efforts, and allow all to make such inferences as may be satisfactory to themselves.

The attention of the Board has been directed to the laws of the city passed July 3d, 1856, and August 21st, 1856, and they respectfully suggest the repeal of both of them. The object of these laws is obviously to prevent hydrophobia, and the Board propose to show their entire inadequacy and even absurdity.

They have examined the mortuary statistics within their reach, and find from the registration reports of the State of Vermont, from 1858 to 1864 inclusive, (seven years) there were 33,588 deaths, and not one case of hydrophobia. In the city of New York, in 1862–'63, there were 46,440 deaths, and only four cases of hydrophobia—one in 11,610 cases. In the State of Massachusetts, from 1857 to 1859 inclusive, (three years) there were 61,022 deaths, and five cases of hydrophobia—one in 12,204.

In the United States during two years there were 624,920 deaths, and 47 cases of hydrophobia, or one case to every 13,296 deaths. In England, in six years, from 1854 to 1859 inclusive, except 1856, there were 2,169,194 deaths, and 41 cases of hydrophobia; that is, one in 52,907. In the summary of the above—2,935,164 deaths—there averages about one case of hydrophobia to every 30,259 deaths—so that, admitting the mortality of this city to be 1,000 a year, we cannot anticipate more than one case in thirty years.

It seems, therefore, that the ordinance is nearly unnecessary, in a sanitary point of view, and is inoperative as a source of revenue, for there has been no tax collected, as shown by the Chamberlain's books. The tax imposed by this law is so heavy that it will not generally, and indeed

will seldom be paid; but a tax of one dollar would be paid by most persons who find it desirable, for protection or pleasure, to keep the animals. This might be collected by the Sanitary Inspector, and the income from this source, added to the amount which has formerly been paid for killing dogs, would pay nearly all the expenses of the Board of Health, and prevent the dogs from becoming so numerous as to amount to nuisances. The books of the Chamberlain show the average expense for killing dogs for the last six years to have been $1,287—a sum exceeding the average expenses of the Board of Health for seven years, by $300.

The Board are convinced that some more effective and thorough system of vaccination is necessary to give proper protection to the citizens. Many people, particularly poor people, *will not* voluntarily attend to the vaccination of their children. The history of all epidemics of small-pox and varioloid *demonstrates* the truth of this remark, as outbreaks of this disease never fail to find numerous unprotected persons, particularly among children. The Vaccine Dispensary has been open certain days, when it was advertised that children could be gratuitously vaccinated, yet but one has been presented for that purpose.

In this city, there should be house to house visitations, as often as once a year, by competent physicians, and if they find any persons who refuse to be vaccinated, or re-vaccinated (if the physicians deem it necessary), they should report them to the Board of Health.

Pertinent to this, is a quotation from the New York *Times* of this date.

"A threatened visitation of small-pox is at present exciting the sanitary authorities, and the importance of vaccination is being urged upon all classes of citizens. It is disgraceful that this shocking disease should number so many victims as it annually disfigures for life or carries to the grave, when a certain and simple preventive is at the

point of every physician's lancet. Carelessness in the matter of vaccination on the part of anybody is criminality. We are glad to know that the Board of Education have adopted a rule making it imperative that every scholar in the public schools shall bring a certificate of vaccination under penalty of dismissal."

One member of this Board, years ago, argued that there should be Coroner's inquests in cases of death from small-pox, of those who had not been vaccinated, and he is glad to find by the following extract from the last number of the London *Lancet* that the matter has been viewed in the same light by one English physician :

"Dr. Lankster, at an inquest which he lately held upon a child that died of small-pox, in the parish of St. Pancras, made some judicious remarks with regard to his holding the inquest. The child was beyond the prescribed age at which vaccination is *enforced* by Act of Parliament ; and the father, by neglecting to comply with the provisions of the statute, had clearly rendered himself liable to a fine. The Coroner is entitled to commendation for having held an inquest in this case, more especially as small-pox is rife in the locality, and the poorer orders are so marvelously prejudiced or ignorant with respect to vaccination. As the life of the child, according to the evidence of the parochial surgeon, would probably have been saved if it had been submitted to the preservative operation of Jenner, the case is all the more painful. If inquests on unvaccinated persons who die from small-pox were generally held, great public benefit would result."

Another measure, important in a sanitary as well as benevolent point of view, is the establishment of a city dispensary, and as some initiatory steps have been taken for the organization of an institution of this kind, in accordance with the general statute of the State on charitable institutions, the Board bespeak for it a favorable consideration by

your Honorable Body when the designs of the movers in the matter shall become more definite. Physicians of this institution, together with the Sanitary Inspectors and the City Physicians would not fail to discover most noxious causes, and promptly become acquainted with any epidemic or infectious diseases, and thus the Board of Health could not long remain ignorant of the sanitary condition of the city.

In connection with this matter of furnishing medical aid for the poor, the Board beg leave to express their appreciation of the appointment of three city physicians instead of one.

Herewith are respectfully submitted, for your information and consideration, the report of the Health Officer; the report of a Special Committee on "Water Supply, Sewerage, and Registration," and a report from the Secretary on the expenses incurred by the Board during its period of office.

The present Board of Health, on resigning the important position which they have held for a fraction of a year, cannot refrain from expressing grateful acknowledgements to a kind Providence in preserving our city from a pestilence which has been severe in many cities of our country, and devoutly hope that our successors may at the end of the ensuing year be able to report as favorably.

All of which is respectfully submitted.

THOS. C. BRINSMADE, M. D., *Chairman.*
WILLIAM BONESTEEL, M. D.
NELSON DAVENPORT.
JAMES FORSYTH.
JAMES S. KNOWLSON.
LEONARD SMITH.
JOHN F. WINSLOW.

BENJ. S. CATLIN, M. D., *Secretary.*

Report of the Health Officer.

To the Board of Health of the City of Troy:

GENTLEMEN:—I have the honor to report, finally, for the term during which I have served as Health Officer under your direction, that there have been

Complaints for nuisances,		587
Of the nature as follows, viz:		
Privy Vaults,	310	
Stagnant water in lots, yards, &c.,	83	
Miscellaneous, embracing all other noxious and filthy accumulations, dead animals, &c.,	218	
Hog pens with hogs,	11	
Total of cases,	622	
Disposed of as follows:		
Complaints abated,	448	
dismissed,	135	
in progress,	4	
Total of complaints,		587

The number of cases it will be seen overrun the number of complaints; which is accounted for by this fact, that two or more nuisances were frequently stated in one complaint.

The dismissed cases comprise all cases found on inspection to have been abated in anticipation or otherwise of a visit from the Health Officer; complaints not affecting the health of the public, or private persons, and frivolous or groundless complaints. The number of cases of Asiatic cholera reported were nine; four of the cases occurring in localities favorable to its production, and all under circum-

stances as regards hygiene or ingesta, likely to have subjected the affected parties to the attack. Five of these cases were fatal.

Ridgway's powder, and other means of acknowledged efficacy, were freely used, and in but one family only (in which two persons were attacked about the same time) was there more than a single case.

Only two cases of small-pox have been reported. The subjects, who were persons from abroad, were at once sent to the pest house, and recovered.

The means adopted for the removal of swill and garbage were efficiently used; but the mere collection and removal is not all that is required, for the exhalations arising from the boxes, barrels, and swill carts are in some degree injurious to health in seasons favorable to fermentation. The State Legislature is being moved in this matter for a general law, which, if passed, will accomplish the complete suppression of all injurious emanations from such sources.

The only part of the city in which malarial disease can be said to prevail, is the southern, from below Monroe street to the Messrs. Burden's establishment on the flats. All orders of the Health Officer, directing filling in or draining in that locality, within the pecuniary means of owners, were obeyed; but there were many cases where such improvements could not possibly be affected, they being beyond the ability of proprietors.

The filling and grading of streets, alleys and lots, are the only remedies, and must necessarily be slow.

Respectfully submitted.

WILLIAM S. COOPER,
Health Officer.

Troy, March 2, 1867.

Report of the Special Committee on Water Supply, Sewerage and Registration.

To the Board of Health of the City of Troy:

GENTLEMEN:—The undersigned, a Committee appointed under and in pursuance of a resolution of your Board, adopted on the 2d day of August, 1866, "to investigate and report "upon the present means of Water Supply to this city, and "also the present extent and character of the public sewer- "age, with such recommendations as they may deem proper "and necessary, with a view to the improvement of the san- "itary condition of the city," report:

That they have taken up the subject matter referred to them, and have called to their aid Mr. C. L. FULLER, the City Surveyor, who has delineated on the map of the city accompanying this report, the present lines of water pipes by which the city is supplied with water. Also the position of the present line of public sewers through which the drainage and sewerage of the city is effected. A topographical survey of the city plot has also been made by him, and the elevation of the street crossings or intersections above common low water mark in the Hudson River, has also been indicated on the said map in figures.

A field book of the entire Water Works system, and also a field book of the entire system of Public Sewers, showing the position, size and character of those structures, have also been prepared by him, and accompany this report.

They have also availed themselves of the valuable aid and suggestions of Mr. E. W. CHAPIN, Superintendent of the Water Works, and have visited the several reservoirs and gathering grounds for the water supply.

The Committee have also been aided in their investigations by the valuable reports of the Water Commissioners,

prepared by ALEXANDER MCCALL, Esq., the able and efficient Secretary of the Board, and made annually to the Common Council, and also by the very learned and elaborate report of Dr. W. P. SEYMOUR, made in the year 1855, while he was the Health Officer of the city, abounding in practical scientific knowledge of the subject, and full of useful suggestions, which have been too long overlooked and neglected.

They have also availed themselves of the valuable results obtained through the Meteorological Register kept for the past fourteen years by the late Dr. THOS. W. BLATCHFORD, in this city.

Your Committee find that the general subject of the sanitary condition of the city, has interested and occupied a large share of the attention of previous Boards, and resulted in many valuable recommendations for improvement, and they therefore abstain from going over the ground again so thoroughly as they otherwise would.

The subject is not new. It has often been before our citizens, but it has been deferred, and will be deferred—so prone are men to bear privations rather than make an effort to remove them—'till some event shall force another spasmodic expensive public effort to do a thing which might have been accomplished by a steady *systematic effort* with economy and comfort.

It is recognized as one of the duties of this Board to do all in their power to bring before the people of this city and its local government for their adoption and support such recommendations as in their judgment shall be for the improvement of the sanitary condition of this city.

The further growth of the city is coming more and more every year to be dependent upon the health, comfort, and economy with which people can live in it.

Sanitary measures are therefore thrust upon our consideration—not so much as a temporary expedient against an epidemic, as a means of building up the city, and affording cheap, healthy, comfortable houses for a large industrial

population, and we shall fail in making this city what, with its unequalled facilities it may and should be, if we neglect to profit by these facilities and the light shed upon us by modern sanitary science.

The first condition of health, is a full supply of good water.

In its normal state, the air we breathe is pure and wholesome. It is rendered impure and miasmatic by the noxious vapors exhaled by evaporation from the fetid earth and decaying substances upon it. With a good supply of water and good drainage we can correct all this in a great degree.

In the order of Nature it would seem that the *ejecta* of men and animals should be returned and used as a manure to the earth.

But cities are artificial creations, and when men crowd together in them, this natural process is impracticable and unsafe, and resort must be had to artificial means by drainage and sewerage, which shall collect the entire offal of a town, and dispose of it under proper conditions as a manure, or else discharge it, as is most common, wastefully in some river.

No soil is able to absorb, for a great length of time the *ejecta* of men and animals, huddled together in great numbers upon it; it will become saturated and changed from its normal condition. Unctuous corruption will ferment in it and exhale noxous gases from it, and a whole town may be living, toiling, eating, and sleeping in the deadly miasm which unconsciously to all enshrouds it.

A well regulated city, with reference to its sanitary system, has been likened to the human body, with its *arterial* and *venous* systems.

The water supply, carrying life, health, cleanliness, and purity to every part of the organism constantly in full fresh tide, repairing the waste of the city, is the great *arterial system*, and like the arteries, it ought to be found in all the limbs and extremities.

The sewerage system of the city should correspond in all

its ramifications with the venous system of the body, and be found in all the extremities, gathering, taking up and returning for renovation or ultimate discharge from the city, by means of drains and sewers, all the stagnant water, the *debris* of streets and alleys, the ejecta of men and animals, the refuse water of markets, kitchens, manufactories, stables, cellars and vaults.

Side by side these two systems should thoroughly permeate and riddle the soil of the city. And so close and intimate should be the connection, that the mud and filth of the surface water caused by showers and rains, and brought down the acqueduct, should be all discharged by the flushed sewers at night, leaving pure water for the city's use.

But it is objected, that we have not sufficient water within reach, nor have our water works capacity for such a purpose.

The *first* objection is *untrue*, but the *second* is a FACT, and must be remedied.

With a very good natural site for a large town, the city has neglected its natural advantages so long that now, in order to avail itself of its unequalled position for an ampler supply of good water, and for a complete system of drainage and sewerage, both of which are now pressing necessities, it will cost a great *effort*, some *time*, and much *money*.

With the Piscawen Creek, and the Poestenkill, and the Wynantskill, plunging down into our midst from the Eastern hills, all within a space of three miles, and with the Hudson River washing the entire front of the city, we have seen for thirty years the Water Commissioners of this city, piddling away with the little Piscawen Creek, that will not fetch water fast enough, anxiously watching the signs for showers—sometimes putting up prayers for rain, and all the time *stinting* with water the *people*, whom they do not omit to *tax* liberally for that article.

We respectfully intimate that the city has in thirty years outgrown the Piscawen Creek, and the present Troy Water

Works, and that there is good water enough within convenient reach, with efficient water works, to supply all our wants, and to flush and clean the city daily.

The *quality* of the water now furnished to the city is good. It is composed of *surface water* in a great degree, gathered from the hills and slopes of Brunswick into the receiving ponds or lakes, covering an area of — acres, from which it is conducted by an open, exposed running brook, which accommodates the farm-yards on its line, and is the watering play-place of cattle, sheep, horses, hogs and geese, until discharged into the reservoirs at the head of the acqueduct.

In spite of all this, chemical analysis, as well as the experience of our citizens, show the water to be *healthy*. It is not pure, is generally muddy, but it is not charged with deleterious substances, is not unpleasant to the taste, and is good for washing and culinary purposes, for which it is far preferable to any of the *well* water of the city.

But would it not be BETTER—and APPEAR at least to be improved—if the brook was diverted from the farm-yards and fenced off from the incursions of animals?

It is now established scientifically that *surface water*—if the *gathering grounds* are clean and elevated, and without swamps or marshes—is the best, and it is sought for and preferred in England, for the supply of large towns.

But the supply of water for the city is inadequate *now* by all the present means in use.

Only the first four old wards can be said to be fairly supplied.

The accompanying map will show that of 15 1-2 miles nearly of water pipe, now laid down in the city, not over three miles can be found outside the limits of these four old wards.

By observation it is apparent that the *gathering grounds* to feed the present Water Works cannot be much increased in extent, for the "lay of the land," the water-shed is not in our favor—not much if any more water from the clouds

can be turned into the Piscawen Creek than now reaches the city through the Water Works.

Of the lower wards, viz: the Eighth is only partially reached by the water pipes, the Ninth and Sixth wards not at all, nor is the Fifth, and the Tenth ward only partially. So that one-half of the wards of the city are "out of water," so far as the city undertakes to supply them.

These wards embrace seven-eighths of the whole area of the city, one-half of the whole number of dwellings and families, and over one-half of the entire population. [See Mr. HUBBELL's Manual of the Common Council for 1866.]

Especially do these people, mostly of the laboring classes, need good water, and an abundant supply, as well as the inhabitants of the inner wards.

The health of the city, the bills of mortality, demand it as a sanitary condition.

The city is now selling water to 1,558 tax-paying resident consumers.

If we assume that each one represents a family of ten persons, only 15,580 people would seem to be supplied with water by the city.

There is collected for water in all that part of the city below Division street only $5,933.68, from 445 consumers; $14,779.34 is collected in all the rest of the city, (which is supplied) from 1,113 consumers. [See Annual Report of Water Commissioners for 1865.]

It would seem that something over one-third of our population only is now supplied with water by the city Water Works. This condition of the water service ought not to continue longer.

Troy may as well prepare for the accommodation of 100,000 people by the close of the present century. They will be here if we get ready for them, and prepare for their use the means by which they can have a cleanly, well-watered, healthy town to live in. And it will be accomplished at the *expense* of the *successive occupants*, doing what their wants demand for the time—if we only *inaugu-*

rate now, and work upon a plan or system, which shall be enlarged and liberal enough, not only for our own wants, but for the greater wants of the multitude who are to succeed us.

Instead of the temporary *make-shift policy* of our municipal improvements, which has heretofore prevailed—under which everything has been done as if we were in doubt whether or not the city would long remain inhabited—now that the city has an assumed position and a principle of growth in it, let us look to the future and *systematize* our efforts and direct our energies in the line of city improvements, so that we shall have something to show for our expenditures in Water Works, Sewerage, Streets and Pavements.

The use of water from WELLS in the thickly settled parts of the city should be discontinued, and the supply should be from the hydrants, or the clear running streams.

Old habits and life-long attachments to favorite wells will be ruptured by this suggestion.

But it is only necessary to refer to the report made by Prof. ELDERHORST in 1856, of his analyses of the hydrant and well waters of the city, and the accompanying report of Dr. W. P. SEYMOUR, the Health Officer at that time, upon the same, to satisfy the most incredulous, that the use of the well waters of the older part of the city *is no longer safe*.

For fifty years the old settled part of the city has had a population upon it, and the soil has received and absorbed its refuse and excretions. Blind drains, vaults and burial grounds are in it. Without surface drainage and without sewers it is saturated with the unctuous deposit of half a century, and yet people act as if they believed that *pure*, healthy water was to be derived from such a soil.

This part of the city is upon a *thin* stratum of earth, or gravel, varying in thickness, and which is underlaid by clay, through which there is no percolation, and this clay is reached by the wells, and often by the basements and privies.

The Board of Health, who are charged with the supervision of the sanitary condition of the city, cannot overlook such facts, and such continuing habits and practices on the part of our people, and they must regard them as a *primal* source of disease, a constant cause of mortality, an invitation and an aggravation to *epidemics*, and they therefore recommend the discontinuance of the use of well water as a drink and for culinary purposes, in all the old settled part of the city.

The Water Works Commissioners, in view of the *short supply* by the Piscawen Creek, and the gathering grounds tributary thereto, for the present wants of a half-supplied city, are erecting a pump wherewith to eke out a supply betimes by raising water from the Hudson River, and injecting the same into the water pipes of the city, at or near the State Dam.

The question arises, is this good, wholesome water?

It is only to be resorted to in the warm, dry season, when the river is low and sluggish. It comes to us immediately charged with the sewerage of Lansingburgh, just above, on the same side, and is constantly stirred with the movements of boats and vessels. Nobody would think of drinking it from the river, and it is not seen how it will become grateful and palatable by being forced through the city pipes.

It will answer to put out fires, and to clean and water streets, and to flush sewers with, if at some future day that practice should obtain among us.

Another consideration, favoring a better supply of water, and one which addresses itself to owners of property, is the increased *rates of insurance* which now prevail in this city. With water enough all about us, if we would avail ourselves of it, by an efficient water works system, the complaint is constant that we have not enough to adequately supply the steam fire engines of the city, when called upon to extinguish a fire of more than ordinary magnitude.

This fact immediately enters in to swell the rates of in-

surance, and it is found that, under like circumstances in all other respects, Troy, from this cause, is paying higher rates of insurance on its property than other cities. Is it prudent or economical, after investing $30,000 in steam fire engines, to expend annually $20,000 for the maintenance of this very important department, and lose their protection for the want of water to supply the engines in emergencies? The vigilance of the Capital Police has in a great degree prevented the spread of fire. But a strictly sanitary consideration is the important one, that there ought to be a sufficient supply of water constantly thrown into this city, by its Water Works, for all its wants, including that of *flushing and discharging its drains and sewers, daily*, in the warm weather.

In 1860, the Water Commissioners, at the request of the Common Council, employed WILLIAM J. MCALPINE, Esq., formerly State Engineer, to make plans and estimates for supplying water to those parts of the city *un*supplied, as high up as Fourteenth street. He made an able and valuable report on the subject. Few, if any, of his suggestions and recommendations for the water supply, have been as yet carried out.

His intelligence and comprehension of the subject were complete, his plans feasible and efficient—but his *estimates* were *frightful* to that very prudent Board.

Some of his results, obtained after survey and personal examination of the localities, and some of his remarks are useful in this connection.

He estimates the population thus furnished with water at 25,000.

And there was distributed from one and a quarter to one and a half millions of gallons of water daily to them, which gave from fifty to sixty gallons to each person, including the water used for manufacturing purposes, the extinguishment of fires, sprinkling streets, and the waste from public and private water-pipes.

And he states (page 26–7) that this *rate* of supply (fifty

to sixty gallons daily to each individual) does not differ materially from that found *necessary* in other northern cities, and indicates with sufficient accuracy the *quantity* which should be provided.

At that time, with a population in round numbers of 40,000, which the census of 1865 shows has not much if any increased in the last five years, it would require two millions of gallons daily to supply each person with the daily quota, fifty gallons.

It is to be noticed that the Water Commissioners in their successive reports constantly maintain that the Piscawen creek is adequate to supply not only the city with its present population, but the city when it shall contain "eighty to one hundred thousand inhabitants." (See third annual Report, p. 16). That all that is necessary to be done is to keep building reservoirs for storage, extending the *catch-water* drains and enlarging the *gathering-grounds*, as the city grows in population.

But Mr. McAlpine is not so sanguine. He says: "When these several plans for increasing the reservoir capacity are carried out, the Piscawen may be relied upon to furnish *two millions* of gallons per day, except in very dry seasons, when it will furnish eighteen hundred thousand gallons." Only enough, it will be seen, to furnish our *present population*, if they were all served with it.

Further he says: "when the demand for water *shall exceed the supply which can be obtained from the Piscawen*, an additional supply of two and a half to three and a half millions of gallons per day can be obtained by diverting the water of the three branches of the Oil Mill creek into the Piscawen at a line fifty feet above the Oakwood reservoir, by a canal three and a half miles long, and it may be extended across the latter into a conveniently located reservoir near Tibbits Avenue, at an elevation fifty feet higher than the occupied lots in the highest portion of the Fifth ward. The route has been surveyed and found entirely feasible for a canal."

This reservoir, he says, can be constructed at a comparatively small expense, the natural features of the ground are such, and can be made to hold one hundred and forty millions of gallons; but one holding fifty millions of gallons would meet all the necessary conditions of the case.

The question is unanswered, where are the four millions of gallons to come from which will be required daily when eighty thousand people are here? Not from the *area* drained by the Piscawen creek, obviously. There is not rain-fall upon it sufficient. Only thirty-six inches in depth of *moisture* in all forms falls upon the land per annum, according to Dr. BLATCHFORD's Meteorological Register. Forty per cent. of this, or fifteen inches, is lost by *evaporation*.

If we allow that the remaining sixty per cent., or twenty-one inches of water finds its way into the lakes and reservoirs of the city water works, the *area* of the gathering-grounds is not large enough to send down four millions of gallons per day. Fourteen hundred and sixty millions of gallons of water per annum is more than can be gathered from all the land that sheds water into the Piscawen creek.

It is for this Board to insist upon a good and sufficient water supply for the city as a sanitary measure — as the first condition of Health. But it does not assume the functions of the Water Commissioners and undertake to supply it. *That* is left to that very capable and prudent Board, with the foregoing suggestions for their serious consideration.

The *Water Service* is a subject demanding our notice.

The present Water Works system is self-sustaining; it is conceded to be the *people's property*. It has been shown that only about 1,560 persons in all the city *pay for it* at present, and that not to exceed 16,000 people are served with it, *probably*, although Mr. MCALPINE assumes in his report that probably about 25,000 were using it 1860. But taking his figures, it will be noticed that 15,000 *people are not served at all*.

And where are those 15,000? If we disregard the Fifth

ward with its 2869 people, as not within reach of the service pipes, we have over 12,000 people, located in the upper and lower wards, and it so happens that they are just the people who want water most—who live for the most part in cheaper tenements, huddled together, and unable to provide themselves with means of health and comfort, and unthoughtful of such things.

A plenty of good water should be distributed to these people as a sanative, even if the cost is taxed on the lots and houses they occupy. The city should do it and take its pay, as it does for police and city government.

Again, the water mains and pipes are too few, and of too small capacity to serve those districts most remote from the *head* or reservoir of supply. The water enters the mains, for distribution through the city at a *head* or elevation of ninety feet above low water mark in the river. (Low water mark is the bottom of the Liberty street Sewer where it enters the river).

With a small main or pipe, the *friction* of a small stream through it is inversely as the diameter, and is sufficient to *stop* the current or flow *almost*, and if obstacles like *sediment* and *mud* are encountered, sometimes *entirely*.

By observation of the pipes taken up in some parts of the town, *one-half* the *capacity* of the pipe is destroyed by this *indurated* mud or sediment, which is nearly as hard as the *iron*, and cannot be removed. This is a great cause of the *short* service of water.

And it shows that water-pipes should be *flushed* and *cleaned* out, of the sediment, often, both to give good pure water, and also to keep them up to their full capacity to flow, and for these purposes also a full abundant supply of water is demanded.

Many pipes are now filled up with indurated mud entirely, and of no further use, destroyed by this oversight and neglect.

DRAINAGE OF THE CITY.

The other great topic connected most intimately with the sanitary condition of the town, and without constant attention to which—as well as to the water supply—all our efforts will be in vain, is the Drainage and Sewerage of the city.

At some labor and expense, the committee have obtained a "Field Book" of what may be called the *Public Sewers* of the city.

Many short *private sewers* have been constructed by individuals, of which no account is taken in this report.

From this "Field Book" it appears that there are 6 and 10-100 miles of public sewers, and that *two thirds* thereof are constructed of brick, and *one third* of stone. An account of the same has appeared in one of the public papers of the city during the past year, derived from this source, which your committee adopt in part, and for greater particularity refer to the said Field Book herewith submitted.

It will be observed at a glance that the whole net-work is utterly without plan or system.

Wherever private or local convenience were to be subserved, and could influence the Common Council, a sewer has been "put through" at the expense of some who did, and many who did not want it.

The "*Outrage*" seems to have excited such a clamor, that in most cases the work has been for a time suspended, or countermanded, and rarely carried out in keeping with the first design. Hence the city exhibits signs of these *spasms* instead of any well devised plan—and our citizens retain memories of unequal and unjust assessments for sewers.

There are three prominent sewers in the city, commonly known as the "Crooked Sewer," the "North Sewer," and

the "Great South Sewer." Each of these has numerous branches running into it, which, with the main avenues, properly form one sewer, and as such will be considered here. There are also detached sewers in different streets distant from these prominent sewers, which will be referred to separately. The most extensive sewer, judged by the ground it covers with its crooked main lines and numerous branches, although the poorest of the three prominent sewers, is termed with singular appropriateness

THE "CROOKED SEWER."

An examination of any old map of the city will show three streams flowing toward the city from the east, located in about the present positions of Hoosick, Jacob and Federal streets, and uniting and finding their outlet into the Hudson about where the foot of Jacob street now is. The "Crooked Sewer," with its three main branches, in reality occupies the place of these three streams, and much of its course lies in the bottoms of the ravines where the natural flow of water was. The old sections of the sewer run principally through private grounds, and have been built to accommodate the water, as the land has been occupied and the ravines filled in. The result of this is that the sewer does very poor service, is of irregular size, built principally of stone, though in some sections of wood, has innumerable crooks and turns, and altogether is a very poor affair. The north branch, or what is termed the main part of the sewer, starts from the open stream on the east side of Tenth street, a short distance south of Hoosick street, and flowing first northwesterly to the corner of Eighth and Hoosick streets, then southeasterly to North Fourth, through North Fourth to a point about half way between Hutton and Jacob streets; thence across private property to North Third, and southwesterly, still across private grounds, to Green street, through Green street across Jacob, to a point half way between Jacob and Federal, then sweeps to the west,

close to the south side of Christ church, runs through the alley nearly to the Union Railroad, winds around and crosses King street, at its intersection with River, crossing the block between King and River streets, and strikes Jacob street about two hundred and fifty feet from the river, and flows through the centre of that street to the Hudson. A short piece of this sewer, at its mouth, is of brick, and new; the rest of stone, and, as mentioned, in some places of wood. Near the intersection of River and King streets, it runs through some of the cellars. The length of this section of the sewer is four thousand, two hundred and twenty feet. Its size varies, but it is about four by five feet.

The middle branch of the "Crooked Sewer" commences at an open ravine above Ninth street and just south of Jacob, and first takes a northwesterly course down through private grounds across Ninth street to Eighth; then sweeps to the southwest, running diagonally through Harrison Place, crossing North Fourth street and the railroad track to Green street, where it unites with the main branch about the centre of the block between Federal and Jacob streets. The length of this middle branch is fourteen hundred and fifty feet. It is about the same size as the other.

The south branch of the crooked sewer commences at the upper side of Ninth street, where it receives a private sewer running through the Warren property from the stream in the ravine, which is the outlet of the "College pond." It takes a zigzag course in a northwesterly direction, crossing Eighth street and the corner of Federal and North Fourth, and joins the middle branch under the Troy and Boston Railroad between Federal and Jacob streets. Length of this branch, eleven hundred and ninety feet. Its size is very irregular. It was this branch, it will be remembered, which burst under Mr. Nims' house, in Haskell's wood yard, and elsewhere, and played havoc in the streets, during the great storm in July.

The above are the main branches of the crooked sewer. There are other shorter ones. The sewer running under

the middle of Jacob street starts at Ninth street, and flowing west, joins the crooked sewer two hundred and seventy feet from the bank of the river. The sewer is fourteen hundred and three feet in length, built of brick. From its starting point in Ninth street to Green street, it is four feet in diameter, and from this point to where it joins the crooked sewer, five feet. This section is a very serviceable sewer.

The sewer in Federal street commences at and taps the south branch of the crooked sewer, where it crosses Federal street just above North Fourth, and extends down, receiving also the drainage of the street, to the Hudson. Its length is twelve hundred and sixty feet, built of brick, circular in form, four and a half feet in diameter. It is this sewer it is proposed to extend up the street to Ninth street, the proposition for which is now pending in the Common Council.

Sewer in North Third street: Starts at a point south of Hoosick, and flowing south joins the crooked sewer where it enters North Third street, at a point half way between Hutton and Jacob streets. Built of brick, circular, two feet in diameter.

Another branch, sometimes called Hutton street sewer, although it merely crosses that street, commences at an open stream in private grounds, about the centre of the block between Ninth and Tenth streets, south of Hutton, and running west and northwest across private ground, crosses Ninth and the corner of Eighth and Hutton, when it takes a westerly course, and crossing the Troy and Boston Railroad, joins the crooked sewer in North Fourth street, just north of Hutton. This branch is of brick, three feet in diameter, and six hundred feet in length. Between Eighth and Ninth streets, this "sewer" is an open stream.

Sewer in Green street: Commencing at a point where the crooked sewer crosses Green street, runs south through the street, and joins the Federal street sewer. Built of

brick, three feet in diameter, four hundred and thirty feet in length.

Sewer in Ninth street: Starts at the crooked sewer in the ravine above Ninth street, and runs north to the head of Jacob street sewer. Length, one hundred and thirty-seven feet; diameter, four feet.

THE NORTH SEWER

was originally designed to drain the water from Union Depot and vicinity. It commences in Union street at the south line of State, and flows north past the depot to Fulton street, then making a right angle turn, runs through the middle of Fulton street to the river. The Union and Fulton street sections of this sewer are of brick, five feet in diameter. Where it crosses State, the ground is so low that, in constructing the sewer, the full circle could not be made without coming to the surface of the street, and the top is built flat at this point.

Two short sewers are located one at each end of the Union Depot, to assist in keeping the track clear of water. They are of brick, three feet in diameter, and two hundred and fifty feet in length, commencing on the east side of the depot, and crossing at right angles with the tracks, join the north sewer in Union street at Fulton and Broadway.

The North Sewer has also two short branches in State street. One starting at the east side of Seventh street, an old stone sewer two feet square, and flowing west across the railroad, joins the north sewer where it crosses State street. Length four hundred and thirty feet. Also a circular brick sewer, three feet in diameter, starting at the west line of Fifth street and flowing east, uniting at Union street. Length, two hundred feet.

Sewer in William street: Starts about half way between Grand Division and Fulton streets, and flows south into the north sewer in Fulton street. This sewer is of brick, two feet in diameter; length, two hundred feet.

Sewer in Church street: Starts about half way between Fulton street and Broadway, and flows north into North Sewer in Fulton street. Built of brick, two feet in diameter; length, two hundred and forty feet.

Sewer in Union alley: Starts at the centre of block between Grand Division and Fulton streets, and flows south into the north sewer in Fulton street. Built of brick, two feet in diameter; length, two hundred and twelve feet.

THE GREAT SOUTH SEWER,

the largest and about the only really good sewer in the city, commences at Seventh street, north of Ferry, at the termination of, and receives the water from, the old Congress road stone sewer, which in reality is part of the great South sewer, although of much older date than the Liberty street section of the same. The first course of the sewer from Seventh street is west, down across the railroad to the lower side of Sixth street, under the tunnel. It was this section of the sewer which burst in the great freshet occasioned by the furious storm in July, previously referred to. The reason of its bursting is very apparent. It is here only four and a half feet in diameter, while the sewer above which joins it is larger, and, in the case of the freshet, threw in a greater volume of water than could flow through the narrow neck. The fall of the sewer above is quite precipitate, and the pressure of water on such an occasion would be enormous, in this case proving more than the walls of the sewer could bear. From Sixth street, the course of the sewer is under private grounds in a southwesterly direction, crossing Ferry, Fifth and Fourth streets, and striking Liberty at the Third street crossing, from which its course is through the centre of the street down to the foot of Liberty street. From Sixth street to the river, the sewer is six feet in diameter. Its length from Seventh street to the river is two thousand nine hundred and eighty feet. It was the original intention to extend this sewer down Third

street to the Poestenkill, instead of through Liberty, and it was so extended a distance of five hundred and fifty feet below Liberty, down to Washington Park. Third street, however, was found so low that it would require a large expense to fill up the street and keep the sewer below ground, and the other course was chosen. The uncompleted section in Third street was left, however, and the water flowing in there since has deposited sediment on the bottom in sufficient quantity to change the course and make it flow back to the main sewer, and in this condition the Third street section drains the lots along its course.

THE CONGRESS ROAD SEWER.

This upper section of the Great South follows the course of an old ravine. It commences at a cesspool near the Congress street Methodist church, and running northwesterly down Congress street, its course being under the walk and the buildings on the upper side of the street, to where Ferry street intersects Congress, when it follows the former down to a point on a line with Eighth street, and then takes a northwesterly course through private grounds to Seventh street, where it joins the Great South Sewer. Its length from the cesspool to Seventh street is two thousand six hundred and seventy-three feet. This is all built of stone, and of irregular size, from three to four and five feet square. Another branch, also of stone, two hundred feet in length, runs into this near the east line of Thirteenth street, south of Christie street, starting in a northeasterly direction from this and near the north line of Christie street.

THE HILL STREET SEWER

commences at a point sixty-six feet south of Washington, flows through Hill street northward past the gas works, and empties into the Great South Sewer at Division street. It

is of brick, three feet in diameter, and six hundred and thirty-five feet in length. This sewer is very much of the nature of a public nuisance. It strikes the Great South Sewer at right angles, and the current of water not readily taking to a square corner, sets back the stream in the Great South above this point, producing very much annoyance to people depending upon that avenue to carry off their waste water, and seriously impairing its usefulness. The difficulty could be remedied by constructing a curve in place of the right angle at its mouth. It was formerly used by the gas works, but by direction of the Common Council, is not at present, and is of little service to any one.

HOOSICK STREET SEWER.

The sewer which finds its way to the river through Hoosick street, is isolated from the other sewerage of the city, as also are a few prominent sewers in other streets. This sewer commences its course at the east side of Eighth street, where it receives the water of two open streams flowing down through ravines, which unite here. This sewer crosses Eighth street, when its course is to the southward across private grounds till it reaches Vanderheyden street, near the corner of Third, where it crosses both of these streets diagonally. From North Third an open stream runs to Green street, where the sewer receives it again and crosses the street. There is another open stream between Green and North Second streets, and at the latter street a stone sewer commences, and runs in a southwest direction to Hoosick street, which it strikes about thirty feet from the river. From this point to the river, the sewer is of brick, and has its course through the centre of the street. The brick portions of this sewer are four and a half feet in diameter, the stone sections three by five feet. Its length, one thousand and sixty feet. There is no public sewerage in the city north of this sewer, except occasional culverts built across streets to accommodate open streams,

the longest one being across Oakwood avenue at the intersection of Tenth street.

GRAND DIVISION STREET SEWER.

The Grand Division street sewer commences at the Sixth street railroad crossing, and has its course through the middle of the street to the river. It is of brick, three feet in diameter, and eleven hundred and twenty feet in length. This sewer has a branch running into it from Maiden Lane. Commencing at Federal street it follows this "crooked alley" south to Grand Division street. It is built of brick, three feet in diameter, and two hundred and fifty feet in length.

BROADWAY SEWER.

The Broadway sewer commences at the west line of Fourth street, from which point to the centre of Third street it is a circular brick sewer, two feet six inches in diameter. From this point to the river, the sewer is oval in form, four feet in diameter, also of brick. Total length, ten hundred and seventy feet. This sewer has a branch commonly called the Troy House sewer, for the drainage of the Troy House, which runs from that building through the alley in its rear, and joins the Broadway sewer in River street. It is of brick—for the first hundred feet of its course two feet in diameter, for the remainder three feet. Length, three hundred feet.

THE MONROE STREET SEWER

is a singular affair. It was constructed without any outlet to the river, or any other running stream of water. Commencing at the alley crossing Monroe street, between Fourth and Fifth streets, it extends through the street to the line of the alley between First and River streets, where

the sewer terminates, and the water running out and being dammed up by the railroad embankment, has formed a slimy, filthy pond at the foot of the street, just east of the railroad, which only escapes in limited quantities by means of a culvert the railroad company have built under their track, and thus finds its way to the marshy lands and to the river. The sewer is of brick, three feet in diameter and thirteen hundred and thirty in length. This sewer has a branch running into it from Madison street, through the alley between Fourth and Fifth streets. It is an old stone sewer, a foot and a half square, three hundred and twenty-five feet in length.

OTHER SEWERS.

There are short detached sewers in other streets as follows: In State street, a brick sewer commencing at First street and extending to the river. Size, three and a half feet; length, four hundred and sixty feet. In Congress, an old stone sewer commencing at River street, and also extending to the river. Size, four feet by two and a half; length, two hundred feet. In Division street, also a stone sewer commencing at River street, and extending to within about fifteen feet of the river, where the sewer terminates and the water works its way through the ground to the basin. In Washington street, a brick sewer commences at First street, and extends to the river. Size, three feet; length, six hundred and sixty feet. In Adams street, a brick sewer commences at River street, and extends to the river. Size, three feet: length, four hundred and five feet. In Second street, a brick sewer, three feet in diameter, starts at the south side of Jefferson street, and empties into the Poestenkill; length, four hundred and sixty-five feet. In Fourth street, a small sewer, one and a half feet square, extends from the north side of Ida street to the Poestenkill; length, one hundred and fifteen feet. A brick sewer commences in the alley between Second and Third streets,

south of Monroe, and runs through the alley to the open creek in Van Buren street. Diameter, two feet: length, nine hundred and fifteen feet. In the Greenbush road an oval sewer, of brick, three by four feet, commences at the centre of Trenton street, and running through the road in a southwesterly direction crosses the intersection of Third street, and enters the open creek in Van Buren street. A private sewer runs from the Female Seminary back through the alley to Ferry street and down Ferry street to the river.

The aggregrate length of the city sewerage is as follows:

	Feet.
Brick sewers, - - - - - -	20,752
Stone sewers, - - - - - -	11,500
Total, - - - - - -	32,252

Or 6 $\frac{10}{100}$ miles.

THE NECESSITY FOR SEWAGE.

Your Committee, in the course of their investigations, have had occasion to observe the great achievements of modern sanitary science, in reference to the subject of drainage and sewerage, and they beg leave to submit some of the results which in their judgment are pertinent.

When human beings congregate, the absolute necessity for the rapid removal of their solid and fluid excreta begins. Persons who live nomadic or agricultural lives experience little difficulty of this kind. The refuse of their persons returns to the soil, which it fertilizes, and by which it is deodorized, and thus becomes a benison instead of a curse. In cities, however, the disposal of these matters is a thing of life or death. It must be done at whatever cost, as a matter of sanitary safety, and this is the first thing to be sought. The agriculturist wants sewage for the sake of its fertilizing powers, and it may thus be made a source of profit. The hygienist must have the atmosphere free from the mephitic gases of sewage. It is difficult to satisfy both these parties, and perhaps we had better not try it. If these

excreta be allowed to collect in cess-pools, they destroy human life; if they be washed away through sewers, they are lost to our wheat fields. Keeping, therefore, the sanitary safety in view, we must obstinately refuse, in the present state of knowledge at least, to put money in our purses from this source. We must get rid of it, even if we lose the profit. Nay, we must do more—pay largely for its removal.

Few persons are aware of the quantity of waste matters to be removed through the sewers. It cannot be estimated without great labor, and must include the water supply as well as the rain-fall and the waste from dwellings, public buildings, baths, wash-houses, manufactories, extinction of fires, cleansing the streets, from fountains, and other sources. The population of the area to be drained must be considered, and also the superficial extent of the neighborhood. If we estimate the water supply at 30 gallons per diem for each person, which is much too small, and a population of 100,000 upon an area of 1,000 acres, the quantity to be provided annually for such a town would be 1,617,720,000 gallons, most of which must pass off through the sewers. It is necessary, we say, to take this into consideration, but it may be laid down, as general principle, that the more water that passes into a sewer the better.

The amount of excrementitious matters to be removed assumes gigantic proportions when it comes to be calculated. Dr. Edmund A. Parkes assumes, taking all ages into account, that the excreta of each person daily are at least 2½ ounces of solid and 40 ounces of fluid matter.

The functions of sewers, then, are to drain the streets and houses; to convey away from the city all the rain-water that falls upon its surface; and all the solid and liquid refuse produced in thoroughfares and buildings. It will be seen that their proportions, dimensions, inclinations, forms and construction are of the highest importance. If they are insufficient in size, bad in shape, improperly built and ventilated; if the gradient be imperfect, the water supply

small, the friction of matters passing through them great; if from any cause they become choked up and fail to discharge their contents promptly; if they open into our basements and their odors escape into our dwellings, they are worse than cess-pools; for the reason that it is less bad for the gases from human excreta and decomposing animal matter to escape into the free air than to be confined in a small space, and forced in a continuous jet through all the sewer openings into the halls and passage-ways of every house, or into our lungs at every street corner. All matters to be carried off by the sewers must be properly collected and properly delivered, and for these purposes the construction of house-drains, their traps, connections and junctions with the mains, require the greatest care and circumspection. If these fail, the efficiency of any system of drainage will be imperfect, and all care bestowed upon the larger works will be useless.

Your Committee, in view of the intimate relation between the system of water supply and the system of drainage and sewerage, as it should be in every city, regard it as important to have their joint action and co-operation in devising and constructing a system of sewage for this city.

In the city of New York the Croton Acqueduct Board under the Laws of 1865, are authorized to construct sewers on a *regular plan*, dividing the city into *districts*.

Each district is mapped out by itself, and has no connection with any other. The mains are built of brick, of different forms and sizes, while the remainder are vitrified stone-ware pipe, from 12 to 18 inches interior diameter. Spurs are put in to serve as connections with house-drains, on each side of the sewers, 15 feet apart. Estimates are first made as to the amount of sewage to be discharged from each district, and the capacity of the sewers determined upon this basis. Separate calculations are, therefore, necessary for each district, and are carefully made before the work is begun.

In Cincinnati, every street, perpendicular, or at right

angles to the river, in the business portion of the city, is made a *sewerage district* containing a large sewer which receives the drainage of half a block on each side, *lateral* sewers being connected with the main under every street and alley.

All these sewers are built upon the most approved plan, with catch-basins sufficient to take up all the surface drainage, and spurs in front of every house—put in while the mains are being built—by which connections may be made by house-drains. The sewers are built principally of stoneware pipe, except where the sizes are too large, in which case bricks are used, laid in cement and made perfectly smooth on their interior surface, the form generally being circular. The manholes are upon an improved plan, and the traps, though imperfect, the best known to engineers. The cost of these sewers is levied upon the abutting property, and equalized throughout each sewerage district.

In view of the general grade above common tide of the city plot, lying between the Hudson and the hill on the East, and the fact of a difference of twenty-four feet between high and low water in the river, your Committee have encountered difficulties in devising and framing a system of sewerage which they would without hesitation recommend. Something, however, must be done—if no more than a plan is suggested upon which to improve or amend.

The sewers must all be discharged into the river—the idea of collecting all the filth of the city, and converting it into a *fertilizer* and thereby creating a *revenue*, is too far advanced as yet for any American town—it is therefore to be *wasted*.

But we must have grade and pitch proper and sufficient to discharge the sewers into the river *above high water mark*. Otherwise they will be flooded and clogged and rendered useless by the back-set of the stream.

The *data* for an intelligent judgment on this subject are beyond the reach of your Committee; they are *facts* to be ascertained by competent engineers and surveyors. And

we respectfully recommend that a thorough and complete scientific survey of the whole city plot be made, with reference to the location, grade, and discharge of sewers; in the belief that a liberal outlay in this particular will be a judicious expenditure, and in the end a saving of money.

After all the examination which your Committee have given to this subject of sewerage for the city, as a sanitary measure of necessity, they recommend,

That all that part of the city lying between Hoosick and Adams streets, and including both said streets, be divided into *sewerage districts.*

That each street within the space aforesaid, running east and west, or at right angles to the river, together with half a block on each side thereof, be made a *sewerage district.*

And that a sewer be constructed in each of said streets and sewerage districts, using as far as practicable the present sewers laid down therein, from a *point* in each of said streets so far *easterly* from the river and westerly from Eighth street as the grade will admit of to discharge said sewers into the river. And that in all of said streets, as shall be found to admit of the proper grade from the *point* aforesaid, there be constructed a sewer to run eastwardly and discharge into a large *main sewer*, to run north and south in Fifth street, and having its upper or north end in Albany street or Broadway. And that *catch-water drains* be constructed to collect the water from the lands on the hill, east of Eighth street, and discharge it into the sewers below.

And that *all sewers* constructed by the *order* or with the *assent* of the Common Council, be made *to conform* to the system herein set forth, or to such system as the Common Council may adopt, after such survey had as aforesaid.

And that the expenses of such structures be *assessed—one-half thereof* on the property in the sewerage district, and *one-half thereof be paid by the city*, but with *equal rates* in all the wards.

Your Committee are aware that no *perfect* system of

sewerage has ever yet been devised—and that no system of *taxation* or *assessment* has yet been attained which does *exact justice* between man and man, yet we may approximate to both.

So long as the *cost of sewers is levied wholly* on the district or *vicinage*, we shall have murmurings, discontent and resistance to these sanitary improvements, and they will be postponed.

It is for the health, comfort and prosperity of the whole city, that those quarters inhabited by the poor and industrial classes should be in good sanitary condition—yet they are are hardly able to pay the *whole* expense, but would gladly undertake to meet half of it.

If this rule was adopted, the construction of a sewer would not be such a *horror* to our people as now, and under its operation the cleanliness and health of the town would soon be sensibly improved.

PAVEMENTS.

The location of the city, under the hill, which sheds water constantly on the land below, and the general grade of the city being not much above high water in the river, and the whole formation and material of the soil being of a nature to take and retain water, the mud and damp of the streets should be avoided and removed as far as possible, and as is consistent with prudence and economy, by a constant effort to get the streets of the city *well paved*.

Impure exhalations from the soil are thereby prevented; drainage is greatly facilitated; the traffic of the street and the health of residents along it are promoted.

Some towns are so high and dry that paving is unnecessary in a sanitary point of view—but this city is to be greatly improved by it.

First and *Second* streets are the only ones which are partially paved with the most approved pavement.

In reference to Registration of Births, Marriages and Deaths, your Committee report: That a bill has been prepared by a Committee of the State Medical Society, and presented to the Legislature, which in their judgment is better adapted to effect the desired object, than the one on the statute books since 1853, and which has proved inefficient for the obtaining of vital statistics from the whole State. This bill was referred to the Judiciary Committees of both Houses, and upon it the Chairman of the Senate Committee has reported adversely.

It is probable, therefore, that the bill will not be enacted during this session of the Legislature, and as the Record of Births and Marriages in a single city, of the size of this, would be of small practical utility, your Committee will not suggest any municipal legislation in regard to these portions of vital statistics, but as the registration of *deaths* is important in its sanitary bearing, it is desirable that a more strict adherence to the present law of the city, passed February 21st, 1861, be enforced, and that a certificate for physicians be drawn and furnished in the form now presented, which is very much like that used in New York and Brooklyn, and which will give some particulars, not required in the blank at present used, the most important of which is naming the *ward* in which the death occurs.

The district in which the greatest mortality is recorded could then be readily ascertained by the Board of Health, and perhaps its causes removed by proper measures.

The Mortuary Records of this city are kept with great care, and perfect system, but an examination of the books show that fully one-third of the causes of death are not verified by certificates of physicians, and the reason assigned for the deficiency by the Superintendent is, that the friends tell him they had no physician. This cannot be the

truth, as it is not at all probable that one case in fifty of disease terminates fatally without having been seen by some physician.

If the section of the law which was repealed February 21, 1861, was re-enacted, *requiring physicians* to furnish to the family, or to the undertaker, or Superintendent, a certificate, whether called upon or not, the defect referred to would be much less, and it would give the physician no more trouble, and the friends less annoyance.

Some physicians are in the habit of forwarding a certificate, immediately after the death of a patient, directly to the Superintendent, through the Post Office, and thus much delay and vexation to all parties is prevented, and more accuracy obtained.

All of which is respectfully submitted.

THOS. C. BRINSMADE,
JAMES FORSYTH,
NELSON DAVENPORT,
LEONARD SMITH,
} *Committee.*

APPENDIX.

FIELD BOOK OF THE WATER PIPES OF THE CITY OF TROY.

Eighth Street Main, 20 *inches*, from Reservoir S. W. to T. & B. R. R., thence to the intersection of Eighth street and along Eighth to Jacob.

River Street Main, 12 *inches*, from Reservoir to corner Canal and Rear streets, thence to corner Canal and River, thence along River street to corner Fulton.

River Street Main, 6 *inches*, from corner River and Fulton along River to a point 275 feet south of Washington street.

First Street Pipe, 4 *inches*, from corner First and River to corner First and Jefferson.

Alley between First and River, 1½ *inches*, from centre of Liberty 80 feet south, and from centre of Washington 120 feet south.

Alley between First and Second, 6 *inches*, from intersection of River and Broadway, 180 feet south.

Alley between First and Second, 1½ *inches*, from centre of State street 160 feet north and 180 feet south, and from centre of Division 200 feet North.

Second Street Pipe, 4 *inches*, from corner Second and River to corner Second and Ida.

Alley between Second and Third, 1½ *inches*, from centre of River street, 80 feet south; from Broadway to State street; from Congress, north 230 feet, south 110 feet, and from Ferry, north 130 feet.

Alley between Second and Third, 1¼ *inches*, from Division, north 175 feet, and south 100 feet.

Alley between Second and Third, ⅝ *inch*, from a point 230 feet north of Congress, and running north 50 feet; from a point 130 feet north of Ferry, and running north 90 feet, and from a point 100 feet south of Division, running south 50 feet.

Third Street Pipe, 12 *inches*, from River Street main 50 feet south.

Third Street Pipe, 10 *inches*, from a point 50 feet south of River Street Main to south line of Congress street.

Third Street Pipe, 8 *inches*, from south line of Congress to south line of Liberty street.

Third Street Pipe, 4 *inches*, from south line of Liberty to Union R. R. crossing.

Mechanic Street, from River Street main down Fulton to Mechanic, up Mechanic 380 feet.

Alley between Third and Fourth, 1½ *inches*, from centre of Fulton street to a point 80 feet south of the south line of Broadway, and from centre of State north 130 feet.

Fourth Street Pipe, 4 *inches*, from corner Grand Division and Fourth streets to a point 150 feet south of Jefferson street.

William Street Pipe, 1½ *inches*, from centre of Broadway 235 feet south, and from centre of State street 80 feet south, and from centre of Congress 220 feet south.

William Street Pipe, ⅝ *inch*, beginning at a point 80 feet south of the centre of State street, and running south 150 feet.

King Street Pipe, 3 *inches*, commencing at upper intersection of King and River, thence to corner of King and Jacob, thence to lower intersection of King and River.

Laundry Place, 3 *inches*, a branch from above running 100 feet southeast through Laundry Place, thence about 175 feet southwest through alley.

Hill Street Pipe, 4 *inches*, from corner Hill and Liberty, through Hill to south line of Washington; and from intersection of Hill and Adams streets 375 feet north and 225 feet south.

Mount Street Pipe, from corner Canal and River, running south 80 feet.

North Second Street Pipe, 8 *inches*, from corner North Second and Rensselaer streets to corner Grand Division.

Fifth Street Pipe, 6 *inches*, running through Fifth from Grand Division to Liberty street.

Rear Street Pipe, 6 *inches*, from Canal to Middleburgh.

Rear Street Pipe, 8 *inches*, from Middleburgh to North street.

North Third Street Pipe, 8 *inches*, from North street to Rensselaer street.

North Third Street Pipe, 6 *inches*, from Rensselaer to Hoosick street.

North Third Street Pipe, 4 *inches*, from Hoosick to a point 175 feet south of State street, and thence two 4 *inch* pipes to centre of Congress.

Alley between Fifth and Sixth Streets, 3 *inches*, from Liberty to Washington streets; also from corner Fulton and Union, 210 feet north.

North Fourth Street, 4 *inches*, from Hoosick to Federal.

Seventh Street, 4 *inches*, from Grand Division to State, and from Congress to Ferry streets.

Seventh Street, 1¼ *inches*, from State to Congress streets.

Seventh Street, 3 *inches*, a branch of above extends easterly through alley between Ferry and Congress, 100 feet.

Harrison Place Pipe, 3 *inches*, extends from Federal street pipe to a point 475 feet north of Jacob street.

Middleburgh Street, 8 *inches*, from Eighth street main to Rear street.

Middleburgh Street, 4 *inches*, extends west from River street main about 275 feet.

North Street, 8 *inches*, from centre of Rear street to centre of North Third street.

Rensselaer Street, 8 *inches*, from North Second street to North Third street.

Hoosick Street, 8 *inches*, from Eighth street main to North Fourth street

Hoosick Street, 6 *inches*, from River street main to North Fourth street.

Fulton Street, 4 *inches*, from North Third to North Fourth streets.

Jacob Street, 6 *inches*, from North Second to North Third streets.

Jacob Street, 4 *inches*, from North Third to North Fourth streets.

Jacob Street, 3 *inches*, from North Fourth to Harrison Place.

Federal Street Pipe, 3 *inches*, from River street main to a point 50 feet west of Eighth street.

Grand Division Street, 10 *inches*, from River street main to east line of Sixth street.

Grand Division Street, 6 *inches*, thence to Seventh street pipe.

Fulton Street, 3 *inches* from River street main to Seventh street.

Broadway Pipe, 3 *inches*, from River street main to Seventh street.

State Street, from River street main to Seventh street.

Congress Street, 10 *inches*, from River street main to Third street.

Congress Street, 4 *inches*, thence to corner Seventh and Congress, and thence through alley north of Congress street to a point 100 feet west of Eighth street.

Ferry Street, 3 *inches*, from River street main to Seventh street.

Division Street, 3 *inches*, from River street main to Fourth street.

Division Street, 1½ *inches*, from River street main about 200 feet west.

Liberty Street, 6 *inches*, from River street main to Third street.

Liberty Street, 4 *inches*, from centre of Fourth to centre of Hill street.

Liberty Street, 2 *inches*, from centre of Hill running 150 feet east.

Washington Street, from River street main to First street, and from Fourth street to alley between Fifth and Sixth.

Washington Place, 3 *inches*, beginning at a point in Second street pipe, 130 feet north of Adams street pipe, and extending to a point 30 feet west of west line of Third street.

Adams Street, 4 *inches*, from a point 50 feet west of River street to Hill street pipe.

Total length of Water Pipe in city 15½ miles (nearly).

FIELD BOOK OF THE PUBLIC SEWERS OF THE CITY OF TROY.

Jacob Street Sewer—Starts at the Hudson river, a square stone sewer, and extends eastwardly two hundred and seventy feet; at which point it is intersected by a round brick sewer five feet in diameter, which extends to the east line of Green street, length four hundred and forty-five feet; thence extending eastwardly, circular brick sewer four feet in diameter, to Ninth street, length nine hundred and fifty-eight feet; total length one thousand six hundred and seventy-three feet.

Federal Street Sewer—Starts at the Hudson river, a circular brick sewer four feet and six inches in diameter, and extends eastwardly twelve hundred and sixty feet.

Grand Division Street Sewer—Starts at the Hudson river, circular brick sewer three feet in diameter, and extends eastwardly eleven hundred and twenty feet, to the east line of Sixth street.

Fulton Street Sewer—Starts at the Hudson river, circular brick sewer five feet in diameter, and extends eastwardly one thousand one hundred and forty-five feet, to Union street; also a circular brick sewer three feet in diameter, starting in rear of Union Depot and extends westerly two hundred and fifty feet.

Broadway Sewers—Starts at the Hudson river, an oval brick sewer four feet in diameter, and extends eastwardly seven hundred and seventy feet, to the centre of Third street; thence a circular brick sewer two feet six inches in diameter, extending eastwardly three hundred feet, to the west line of Fourth street; also a circular brick sewer, three feet in diameter, starting at Union street and extending eastwardly two hundred and fifty feet.

State Street Sewers—Start at the Hudson river, circular

brick, three feet six inches in diameter, and extending eastwardly four hundred and sixty feet, to the east line of First street; also a circular brick sewer three feet in diameter, starting at Union street and extending westwardly two hundred feet, to the west line of Fifth street; also a square stone sewer two feet by two feet in the clear, starting at Union street and extending eastwardly four hundred and thirty feet, to the east line of Seventh street.

Congress Street Sewer—Starting at the Hudson river, square stone sewer four feet by two feet six inches in the clear, and extends eastwardly two hundred feet.

Congress Road Sewer—Starting in Seventh street, square stone sewer, and extends eastwardly—as represented on the plan, size irregular, length two thousand six hundred and seventy-five feet; branch from same near the east line of Thirteenth street, south of Christie, running northeasterly about two hundred feet, to a point near the north line of Christie street.

Division Street Sewer—Starting at a point about fifteen feet eastwardly from the Hudson river, a square stone sewer one foot six inches by one foot six inches in the clear, and extending eastwardly three hundred and twenty feet, to the east line of River street.

Liberty Street Sewer—Starting at the Hudson river, circular brick sewer six feet in diameter, and extends eastwardly one thousand three hundred and fifty feet, to Third street; thence northeasterly, crossing private lands, about one thousand four hundred and fifty feet, to Sixth street; thence a circular brick sewer four and a half feet six inches in diameter, extending eastwardly one hundred and eighty feet, passing under Troy Union Rail Road to Seventh street.

Washington Street Sewer—Starts at the Hudson river, circular brick, three feet in diameter, and extends eastwardly six hundred and sixty feet, to a point in River street.

Adams Street Sewer—Starts at the Hudson river, circular brick sewer three feet in diameter, and extends eastwardly four hundred and five feet, to a point in River street.

Monroe Street Sewer—Starts at the east line of the alley between River and First streets, circular brick sewer three feet in diameter, and extends eastwardly one thousand three hundred and thirty feet, to the alley between Fourth and Fifth streets.

Hill Street Sewer—Starts at a point sixty-six feet south of the south line of Washington street, circular brick sewer three feet in diameter, and extends northwardly six hundred and thirty-five feet to the South sewer.

Greenbush Road Sewer—Starts at the centre line of Trenton street, an oval brick sewer three feet by four feet in diameter, and extends southwardly three hundred and sixty feet, to the centre of the end of Van Buren street.

The Crooked Sewer—Starts at the Hudson river in the centre of Jacob street, and extends eastwardly up Jacob street two hundred and seventy feet; thence southerly, as shown on the plan, to a point near the Troy Union Rail Road, at the intersection of King and River streets; thence northeasterly about three thousand nine hundred and fifty feet, to a point in the east line of Tenth street south of Hoosick street—size about four feet by five feet. Also a branch out of same, starting about the centre of block between Federal and Jacob streets, and in alley east of North Second street, which extends eastwardly, as shown on plan, one thousand four hundred and fifty feet to a point one hundred and twenty-five feet south of Jacob street and one hundred feet east of Ninth street. Also a branch from same, built of stone, starting in Sixth street and runs southwesterly along Sixth street about one hundred and seventy-five feet; thence southeasterly to a point near the east line of Ninth street, south of Federal—length one thousand one hundred and ninety feet, size irregular.

The above Crooked sewer and branches out of same, are represented on plan as composed entirely of stone, but are of stone, wood and brick, size irregular, depth below the surface from three to thirty feet; the sewer most of the way was put in bottom of ravine.

Hoosick Street Sewer—Starts at the Hudson river, a circular brick sewer four feet six inches in diameter, and extending eastwardly about thirty feet; thence, a square stone sewer three feet by five feet, northerly on private grounds, crossing at north side of Hoosick street and extending easterly to a point ten feet east from east line of North Second street, length four hundred and ninety feet; also a continuation starting at Green street, a circular brick sewer four feet six inches in diameter, and runs north-easterly to the corner of Vanderheyden and North Third streets; thence north-easterly to a point near Eighth street, receiving water from open drains. Length five hundred and forty feet.

Hutton Street Sewer—Starts in North Second street at the Crooked sewer, a circular brick sewer three feet in diameter, and extends easterly as represented on the plan. Length six hundred feet.

North Third Street Sewer—Starts at the Crooked sewer in North Third street, circular brick sewer two feet in diameter, and extends northwardly eight hundred feet, to a point four hundred and fifty feet north of Hutton street.

Green Street Sewer—Starts at Federal street, a circular brick sewer three feet in diameter, and extends northwardly four hundred and thirty feet to the Crooked sewer.

Ninth Street Sewer—Starts at Jacob street (continuation of Jacob street sewer), circular brick sewer four feet in diameter, and extends southwardly about one hundred and thirty-seven feet to ravine.

Union Street, or North Sewer—Starts at Fulton street (continuation of Fulton street sewer), circular brick sewer five feet in diameter, and extends southwardly nine hundred and twenty feet, to the south side of State street (this sewer is not a full circle—at State street running to top or surface of ground).

Alley between First and Second Streets, or Troy House Sewer—Starts at the sewer in Broadway and extends southerly, circular brick sewer three feet in diameter, to a point

two hundred feet south of south line of Broadway; thence a circular brick sewer two feet in diameter, and extends southerly one hundred feet. Total length three hundred feet.

Third Street Sewer—Starts at Liberty street in Third street (continuation of South or Liberty street sewer), circular brick sewer six feet in diameter, and extends southwardly down Third street five hundred and fifty feet. This sewer pitches southerly.

Second Street Sewer—Starts at the south side of Jefferson street, circular brick sewer three feet in diameter, and extends southerly four hundred and sixty-five feet to the Poestenkill.

Fourth Street Sewer—Starts at the Poestenkill and extends northerly one hundred and fifteen feet, to the north side of Ida street. Circular brick sewer one foot six inches in diameter.

Sewer in Alley between Fourth and Fifth Streets—Starts at Monroe street, square stone sewer one foot six inches by one foot six inches, and extends northwardly three hundred and twenty-five feet.

Sewer in Alley between Second and Third Streets—Starts at Van Buren street, oval brick sewer two feet in diameter, and extends northwardly nine hundred and fifteen feet.

Crooked Alley Sewer—Starts at Grand Divison street sewer, circular brick sewer three feet in diameter, and extends northwardly two hundred and fifty feet, to a point in Federal street.

Sewer in Alley between Fifth and Sixth Streets—Starting at Fulton street, circular brick sewer two feet in diameter, and extends northwardly two hundred and twelve feet.

Sewer in Alley between Fourth and Fifth Streets—Starts at Fulton street, circular brick sewer two feet in diameter, and extends northwardly two hundred feet.

Sewer in Alley between Third and Fourth Streets—Starts at Fulton street, circular brick sewer two feet in diameter, and extends southwardly two hundred and forty feet.

Total length of brick sewers, twenty thousand seven

hundred and fifty-two feet, or three and ninety-two one-hundredths miles.

Total length of stone sewers, eleven thousand five hundred feet, or two and eighteen one-hundredths miles.

Stone and brick, six and ten one-hundredths miles.

STATEMENT OF EXPENSES.

OFFICE OF THE BOARD OF HEALTH,
No. 16 STATE STREET,
TROY, N. Y., APRIL 4, 1867.

To the Chairman of the Board of Health:

SIR: I have the honor, agreeable to your request, to submit the following transcript, from the minutes of the Board, of the expenses incurred and authorized during its period of administration, viz:

Salary of Health Officer,	$1,000 00
Amount paid Secretary, as per resolution,	200 00
Amount paid Acting Sanitary Inspector—June and July, 1866,	111 53
Rent and Incidental Expenses of Office,	134 97
Printing and Advertising,	150 25
Distributing Bills and Tracts,	14 25
Stationery,	34 05
Carriage Hire,	9 00
Teams and Labor on Miscellaneous Work,	155 75
Removal of Swill,	78 00
Repairs, Labor, and Material on Fulton Market,	103 18
Repairs, Labor, and Material at Sixth Ward School House,	90 00
Cleaning of Vaults,	210 00
Burial of Cholera Patient,	10 00
Marshall Infirmary, care of Small Pox Patients,	22 00
Lime and other Disinfectants,	87 85
Lumber,	2 80
Certain Surveys, ordered by Committee on Water and Sewerage,	97 50
	$2,511 13

Deduct amounts adjudged and determined on owners and occupants of property, - -	$549	59
Deduct, as belonging to other City Departments, expenses incurred at Fulton Market and Sixth Ward School House, - - -	193	18
	$1,768	36
Add estimate of Salary of Sanitary Inspector for nine months, - - - - - - - -	666	66
Total (proper), - - -	$2,435	02

All of which is respectfully submitted.

BENJ. S. CATLIN,

Secretary.