Document No. 48.

REPORT

OF THE

STATE SEWERAGE COMMISSION

TO THE LEGISLATURE, SESSION OF

1900

REPORT.

To the Legislature:

The State Sewerage Commission, appointed under Chapter 210, Laws of 1899, begs leave to herewith submit its annual report.

The Commission organized according to law, at Trenton, on May 8th, 1899, by the election of William T. Hunt, Chairman; John Hinchliffe, Treasurer, and Boyd McLean, Secretary.

The law under which the Commission had been appointed was passed late in the legislative session, and the annual appropriation bill failed to make provision for its expenses, or for the prosecution of its work. Deeming the subjects under its consideration and control of such importance as to necessitate immediate action, the situation was placed before his Excellency the Governor, and he has authorized an expenditure from the funds under his disposition to an amount sufficient to provide office-room, employ clerical assistance and pay actual necessary expenses, without compensation to the Commissioners. The Treasurer herewith submits a statement of the expenditures authorized, and by close economy the Commission is able to report that only one thousand one hundred and sixty-one dollars and fifty-eight cents ($1,161.58) has been expended.

The limited sum available for use has prohibited the employment of engineering assistance, and has prevented that detailed investigation of methods of sewage disposal which it was part of the purpose of the law of 1899 to obtain through the agency of this Commission. The Governor's considerate appreciation of the necessities of action alone enabled the Commission to proceed with any part of its task, and the thanks of the public are due to him for the action taken, enabling the Commission to present facts of considerable value to the State.

The Commission is satisfied that the results of a year's experience justify the wisdom of legislation upon this subject. While the powers conferred were limited, numerous cases have arisen which have shown the need of State supervision over sewerage systems. We deem it the

province of the State to provide such information as will properly guide action in regard to one of the questions which most nearly affects health and comfort, the proper disposal of the waste of crowded municipalities. The subject is one which is engrossing attention not only in this country, but throughout Europe, and it has been generally thought to be a wise public policy to give it separate consideration, through the appointment of boards or commissions charged with that duty alone. The cost of investigation to municipalities is often too great to be borne by them, and each would be compelled to traverse ground which had been gone over by others. But the necessity of some general supervision is most clearly shown by the difficulties which have arisen among several communities in this State, as well as in other States, in regard to the local disposal of sewage. While there are some communities so fortunately located that the discharge from sewers may be disposed of without objection from neighboring communities, this condition is growing more rare, as population increases and as health requirements become more severe. To permit one community to discharge its sewers practically upon the territory of another, to the injury of its people, cannot be tolerated, and the courts have already interfered in defence of private rights thus endangered. Obviously, state authority, operating through a properly constituted commission, must be invoked to regulate the relations between the municipalities. While your Commission was at first disposed to regard this branch of its duties likely to require little time, compared with the duty of investigating and advising upon new systems, it has developed during the year that this regulation of the matter of sewage discharge, as affecting streams and drainage therein and the health of neighboring communities, is second to no other duty; and that its wise performance will save much unfortunate litigation, correct bad sanitary conditions and prevent the waste of public money.

The Commission now has only the power of veto upon new sewerage systems which it may deem injurious to the public. Its consent being required for new systems, it is able to stipulate that they shall be free from serious objection, either in their effect upon streams which receive the effluent, or upon the neighboring towns or cities. The Commission has been able to exercise this power with benefit to the interests of all. The Commission fully appreciates the necessity of local sewerage, and the limitations as to expense in small municipalities, and it has endeavored to so adjust its views upon applications

received as to secure reasonable protection from ill effects without making its requirements so severe as to discourage sewerage plans. A hearty appreciation of this spirit has fortunately marked its relations with the communities whose needs have been considered.

It is evident that the Commission should be granted additional power to require from cities and towns having sewerage systems, measures which will prevent injury to the streams of the State and the owners of property along their banks. The Passaic river case, which is elsewhere discussed, is the most prominent, but is by no means the only one where serious disputes have arisen, and are arising, owing to the injurious discharge of sewage, long established.

Appeals to the courts for injunctions, or suits for damages, may provide a remedy, but they involve large cost, and they necessarily follow the injury done, rather than prevent it, and they must often be too late to save life and health. It is believed by your Commission that power to regulate existing sewerage systems to the extent of preventing nuisances which will sooner or later involve the communities or individuals in costly litigation should be conferred upon this body.

Several applications have been made to this Board for permission to discharge sewage into streams. Among them was that of the Commission of the State Reformatory at Rahway to discharge its sewage into the Rahway river. While the case was one in which claim was made that no serious injury would be inflicted by the additional discharge, it was the opinion of this Commission that the State should not, through one of its institutions, in any way add to a river's pollution, and that provision for treatment of the discharge should be required. It is hoped that the State institutions will be an example of effective treatment of sewage discharge, so far as practicable, and money spent in that way will not only conserve the health of institutions, but make models to the smaller municipalities.

Plans for a joint suburban sewer authorized by the Legislature to afford sewerage facilities for the towns of West Orange, South Orange, Millburn, Vailsburgh, Irvington, and a part of Newark, were approved by the Sewerage Commission, with the addition of the Town of Summit. Arrangements have not been completed for passing through Elizabeth. The Commission's assent to the point of discharge into the Arthur Kill was given, with the proviso that should

future exigencies make treatment necessary, it would be required. The work promises to be of much benefit, and the addition of Summit to the municipalities thus drained of house sewerage will remove a nuisance caused by the discharge of the Summit sewage into the upper Passaic. The Commission visited the existing Summit disposal plant and recommended the connection with the joint sewer, which promises to relieve the town from vexatious litigation and provide it permanent relief from future difficulty. The Commission suggests that if the work of the joint sewer should be conducted under the act creating this Commission, and providing for local boards of control, much annoyance and delay might be avoided.

In these and other cases submitted to your Commission it has been necessary to use careful judgment, and while not discouraging laudable public improvements, to require that proper safeguards to public health be maintained.

A considerable district, with large suburban population, in the county of Morris, is without public sewerage facilities, and complaint has been made that the present discharge from cesspools and private sewers endangers the water supplies of the cities below. Early consideration of the necessities of this district is required.

In accordance with law the Commission prepared aud sent to the municipalities of the State blanks for information upon their sewerage systems and subjects related thereto, and the responses proved of much value. These are given in detail as an appendix of the report, and present a mass of information which will prove of use in future work of the Commission, as well as of considerable public interest. Statistics of this character have not been collected heretofore in this State, and some of the municipalities have gone to considerable trouble and expense to furnish the information desired. The reports show widely varying conditions in many details of municipal economy, and a careful study of them by engineers may develop some methods of regulating wastes which exist. A factor in this sewerage problem is noted in the large consumption of water in many of the cities. It is apparent that this costs the people large sums; but it is not always realized that the waste also costs a considerable amount for its removal. It is hoped that the statistics presented will lead to changing methods which are not in accordance with economical business requirements.

The number of municipalities having water supply but no sewerage is notable, and the universally recognized need of coupling the two in public improvements should be impressed upon the municipalities so situated. Another regrettable feature is the number of places having sewerage systems under the control of private companies. An arm of municipal government so intimately associated with public health should be kept under public control.

The Commission recognizes that rapid changes from long-established and costly systems of sewerage are impracticable; but in new sewerage work it is evident to all who have examined the subject, that house-sewerage should be separated from land-drainage, excepting possibly in a few rare instances. Most of the older cities have constructed their sewers upon the so-called combined system. Indeed, in some of these, the first sewers were constructed for the drainage of surface water alone, and not until after they had been in operation for several years were connections made for house-sewage. The combined system makes adequate treatment of the sewage of a city difficult and vastly increases the cost. All of the problems of disposal which are so appalling to the cities of this State now polluting the rivers, would be greatly simplified if the separate systems of sewerage could be substituted, while complaints of interference with navigation by reason of deposits from sewers would be made less serious. While it is not to be expected that the combined system is to be abandoned at once, it seems to the Commission obvious that new work should be on the separate system. Its economy, present and future, recommend it, and its sanitary advantages are beyond question. While this is purely a local matter, the Commission deems the suggestion among the most important.

The failure to obtain satisfactory replies from several places from which intelligent statement was expected, disappointed the Commission. As a rule, this appears to be due to the lack of engineering advisers, no permanent official being charged with the control of engineering work. This saving in salary is a costly economy, as a rule, leading to difficulties and extravagances which competent advice would easily enable the municipality to avoid.

The New Jersey Commission has placed itself in communication with authorities of other States, and finds in each difficulties which closely resemble those encountered in this State, both as to the pollution of streams and methods of treatment. A visit under the

auspices of the Connecticut Commission to the city of Meriden, Connecticut, gave the Commission an opportunity to inspect the most perfect system of intermittent filtration yet seen. The existence of wide and deep natural beds of coarse sand, at a convenient distance below the city, enabled the engineers to apply this familiar system to the best advantage. Meriden well represents a class of cities where natural conditions are of almost ideal character for successful local treatment of sewage at small annual cost and with practically perfect purification. But the conditions were natural, and the success of plants so located is too often confused with the merits of a system. The case illustrates the desirability of making use of local conditions, and points anew to the necessity of treating each case of sewage-disposal according to situation, soil and requirements, independent of systems which may operate admirably elsewhere but would not meet the need of the special case.

The Commission also made a visit to Reading, Pa., to inspect a system of artificial aeration, but was not favorably impressed. An experiment which has been observed with interest is that at the Essex County Asylum, near Verona, in that county, where a septic tank for the bacterial treatment of sewage has been constructed and is in operation, supplemented by coke filter-beds. The plant has been in operation a short time only, and its merits require further tests. It is, however, closely allied to systems now undergoing extensive experimentation in England, and should the claims of the engineers who have prosecuted the works be verified, a solution for some of the gravest of our State problems would appear to be near.

The Commission has made other inspections and has been kept informed of recent development in the science of sewage disposal. It is hoped during the coming year that this branch of enquiry will receive more attention, and that practical investigations may be made of all well-tested systems.

The Commission has held weekly meetings at its office in Jersey City, and has given a number of public hearings. It has found that the work entrusted to its care has demanded the almost daily attention and consideration of its members. The general subject is so large and the need of constant study so pressing that the labor has proven greater than was anticipated. On the other hand, no branch of modern science is more interesting, and in none is there greater opportunity for usefulness.

THE PASSAIC RIVER.

The purification of the Passaic river has been, and is, the greatest problem which has demanded the attention of the Commission. The magnitude of the undertaking can hardly be exaggerated. The report of the Passaic Valley Commission of 1897 set forth the then existing conditions. The commissioners appointed under the act of 1898, to "consider the pollution of rivers and streams of this State" said in referring to the Passaic river: "The condition of the Passaic river has been getting worse, and during the last summer the conditions were even more intolerable than during the drought of 1895." Bad as was the condition then, that during the summer of 1899 has been far worse than ever before known. As early as June serious complaints were made of its condition, which have continued during the whole summer and into the autumn.

It is a common error to suppose that the condition is solely the result of the pollution of Paterson and Passaic and the municipalities at or above the head of tide water. While these communities are large polluters of the river, others are equally guilty. During much of the time the Passaic river is little more than a tidal estuary, in which the outward flow of the tide is not of sufficient duration to empty the river of the polluted water. The incoming tide meets the sewage of Newark, Orange, Bloomfield, Montclair, Harrison and neighboring towns, driving it up the river to meet that coming from above, so that to a great extent the same water, with constantly increasing quantities of sewage being added, is driven up and drawn down by the tide until large rainfalls occur, when there may be a flow of water from above sufficient to force the sewage out and fill the river with clean water. This temporary relief continues as long as there is water coming down sufficient to force back the tide and allow the sewage to find its way to the bay.

The Commission received numerous complaints from residents along the river, it having been necessary for people a half-mile from the river to close their windows during the hotest weather to keep out the stench. The constantly increasing quantity of sewage being poured into the river, together with the decreasing amount of water coming down for the dilution of the sewage, have hastened the time when some remedial action has become imperative. It is recommended that legislative action be promptly taken to abate the foul condition of the

Passaic river. To this end a bill has been drafted empowering the State Sewerage Commission to require such other disposition of the sewage and other polluting substance as shall meet with its approval, believing that when it becomes obligatory for those fouling the river to do something else with their sewage, they will join with your Commission in seeking the best way. The Commission has sought to unite the different municipalities in some voluntary action, and with that end in view invited the several municipalities now discharging their sewage into the river to appoint committees to meet with the State Commission for the purpose of considering the subject. Several of the municipalities appointed such committees and at a meeting of the gentlemen composing these committees, at the office of the Commission, there was a free expression of opinion, which developed the fact that so far as these gentlemen reflected the views of their respective municipalities, all there represented, with one exception, were in favor of prompt action to remedy the evil. The lack of an appropriation to pay the cost of engineering or professional work prevents the Commission from making specific recommendations as to the best means of disposing of the sewage of the Passaic valley.

It is obvious that the first step is to make it necessary for those polluting the river to find some other place for their sewage, or to purify it so as to make it harmless in its effects upon the river. It is not to be expected that the river below Paterson can ever be made good potable water, the natural wash of the land in so populous a district, if no sewage entered the river from the sewers, making it unsuitable for that purpose, so that the best we can expect is that the river shall not be a source of offence or injury to the inhabitants of the vicinity either in their health, comfort or property. That even this involves great expense is true. The bringing of potable water from a distance for domestic use is also expensive, yet few would think of using the foul surface water from local wells because the other is costly. None question the duty of each municipality to supply the inhabitants within its borders with good water. Just as obvious is the duty to remove its own filth, not only to a place where it will not be injurious to its own inhabitants, but where it will not harm a neighbor. The contention that a municipality should not be restrained from polluting a stream to the injury of those on the borders of that stream until they are shown some other place to put it, is fallacious. That arm of the State which compels one person to

respect the rights of another may be justly invoked to compel a municipality to cease to do harm to those suffering from its pollution of a stream.

It may be said that there are several ways of harmless sewage disposal. Where the conditions are favorable, that of dilution is by most experts considered most satisfactory. The Commission of 1897 recommended a trunk sewer carrying all the sewage of the Passaic Valley to Newark Bay, believing that for many years to come the crude sewage could with safety be discharged into the bay, depending upon the great volume of water there for the dilution of the sewage to a harmless condition. Many question whether the volume of water is sufficient to dilute in a satisfactory manner so vast a quantity of sewage as would come from this populous district.

If there were no question as to there being a sufficient volume of water to satisfactorily dilute the sewage, it has been suggested to the Commission that perhaps this dilution could be accomplished by cutting a canal from Berry's creek, on the Hackensack meadows, to the Passaic, and providing tidal gates at the Passaic end, which would close against the incoming tide and open with the outgoing; the other end to have gates which would open with the incoming tide and close with the outgoing, thus automatically receiving the water from the Hackensack river through Berry's creek and discharging it in to the Passaic river. If made of sufficient capacity, the polluted water would be forced out of the river, its place being taken by the water taken in from the Hackensack. Once in operation its action would be automatic with little or no expense for operation, while the sewers could discharge into the river as now, with the exception of Paterson, which would have to be extended to tide water. The question suggests itself whether the volume of water taken into Newark bay by tide would be great enough to dilute satisfactorily the pollution coming down the Passaic.

The doubt of there being a sufficient volume of water in Newark Bay to satisfactorily dispose of the sewage there by dilution by either of the plans referred to, leads to the consideration of other means. It has been suggested that the outlet of the trunk sewer could be extended beyond Staten Island to New York Bay. This would involve a question of state jurisdiction that might not be easily overcome. The cost might prohibit so great an undertaking, until there is such

an increase in the taxable wealth of the district as to make the burden light.

The objection to either of the above means of final disposition seems to point to the conclusion that if a trunk sewer is built to Newark Bay, some treatment of the sewage must be resorted to before discharging into the bay. There is no question but what this could be done in a satisfactory manner.

If this treatment be necessary it suggests the question whether some of it could be done nearer home at less expense, either by each municipality separately, or by dividing the territory into two or more districts. A trunk sewer to Newark Bay involves a sewer of large size from Second river to the bay, as well as the pumping at that point of all the sewage coming from the upper section, which would be a continual expense. The sewage from a district including all that section below Second river, together with the sewage coming from the Orange and Montclair joint sewer, would probably flow by gravity to the pumping station on the meadows. Belleville and Franklin could be included in this district.

The upper section could unite in an intercepting sewer, including Paterson, Passaic, Garfield, Wallington, East Rutherford, and perhaps Rutherford and neighboring towns on the line, conveying the sewage to a point on the Hackensack meadows far enough from any residence to prevent its becoming a nuisance, there to be treated. The distance would be some miles shorter than to Second river at Belleville; the flow to this point would be by gravity, and one pumping of the sewage of this section might be saved. The separate treatment of this section would decrease the size of the sewer from Second river to Newark bay.

That section east of the river and south of Belleville turnpike, including Harrison, Kearny and neighboring towns, could join the Newark district, or act independently, building an intercepting sewer to the meadows and there treating the sewage.

It is possible that some municipalities would find it desirable to act independently and treat their sewage by some of the methods now in use and being constantly developed.

These are all questions in which expected results and estimated costs will become the deciding factors. It is proposed that the State shall compel the municipalities to take their sewage from the river by authority to be vested in the State Sewerage Commission. The

Commission should be in position to make recommendations that will be of assistance. It should not be expected that it will furnish plans of sufficient accuracy for working details, but should, in a general way, give approximate costs that will be a guide to the municipalities in determining their preliminary action, it not being supposed that those who may be empowered to build disposal works will do so without detailed plans made by their own engineers.

To Summarize:

The pollution of the Passaic river should be stopped.

The first step is to make it obligatory for those polluting the river to make some other disposal of their crude sewage than putting it into the river.

A reasonable time should be given for building suitable disposal works.

No limit of time should be given beyond five years from the date of the approval of the act.

Discretionary power should be given the State Sewerage Commission to fix the time when pollution shall cease, within the five-year limit.

The method of sewage-disposal is one which belongs to the municipality or drainage district, subject to the approval of the State Sewerage Commission.

The Sewerage Commission should investigate the different plans and give the approximate cost under either.

The Commission should be provided with funds to pay the cost of making surveys, estimates of costs and the conducting of such experiments as will enable them to make recommendations and give advise that will be of value.

The following plans are thought to be feasible:

1. A trunk sewer conveying the sewage of the whole Passaic valley below Paterson falls to Newark bay, there to be treated.

2. Dividing the valley into three districts, one to embrace all that section of the west side of the river below Second river, including all that drained by the Orange and Bloomfield joint sewer and sections tributary to it. The second to include Harrison, Kearny and all that section east of the river and south of Belleville turnpike, taking the sewage to the meadows for treatment. The third taking in Paterson, Passaic, Wallington, East Rutherford, Rutherford and sections tribu-

tary to this line, with an intercepting sewer to Hackensack meadow and there treating the sewage.

Local treatment of sewage is not altogether encouraging because of the difficulty of locating the plant where it would not be a nuisance to the locality, although this is feasible in some instances.

While all these plans are looked upon as practicable, which should be adopted can only be determined by engineering investigation and approximate estimates of cost, which the Commission should provide. The cost of the work should be distributed according to the benefits received, under the control of the courts, with a redistribution from time to time. The experience of Massachusetts in this matter is recommended for consideration.

These having been provided by the State, it devolves upon the interested municipalities to decide what they will do, the State insisting only that they shall take their sewage from the river, disposing of it in some manner that will meet the approval of the State Sewerage Commission.

GENERAL RECOMMENDATIONS.

The Commission again urges upon the Legislature the necessity of wider powers, to correct abuses and nuisances in existing systems, besides those specifically set forth in the case of the Passaic river. Power should be granted to receive and pass upon complaints and to direct a remedy, appeal being allowed if necessary. The Commission should have power to conduct litigation and appear as complainant on its own motion.

It has been obvious that existing laws for the prevention of the pollution of water supplies are not adequate, and that an appeal to the courts in each petty case is vexatious and dangerous to health by its delays, while an order to abate a nuisance without recommending a remedy may often inflict injustice. The Commission suggests that the preservation of water supplies from pollution should be placed under its control, with adequate legislation to meet the gravest necessities of the case. It would appear to be a consistent part of its work, and while the task would be considerable, it would be cheerfully undertaken.

The necessity of combining two or more municipalities for sewerage is increasingly frequent, and provision for doing this more speedily and with less difficulty than the existing law provides is recommended.

During the year 1899 sewerage cases of far-reaching importance have been before the courts, and now await final decision upon appeal. Two of these were with reference to the discharge of sewage into the Passaic river; one against the city of Paterson, on complaint of riparian owners below the city, and one against the city of Newark to enjoin the construction of a sewer which would discharge near the docks of the complainants. In both cases injunctions were granted by the Court of Chancery, and additional sewerage discharge from the city of Paterson was prohibited, while the construction of the Newark sewer in question was halted. The embarrassment to both municipalities has been serious; and should the views of the Chancery Court be sustained upon appeal, immediate action for the relief of the cities will be necessary. The Commission understands that no decision of the appeal will be made until March next, when the legislative session will be near its close. Whatever the further action of the courts may be in these special cases, it is apparent from the decisions of the Chancery Court that the cities of the State discharging their sewage into rivers are in danger of encountering legal obstacles which may embarrass them in all the functions of government, unless a means of relief be provided by legislation. The doctrines set forth by the Chancellor in his opinion are those which prevail in other affairs, and which have, so far as they have been applied, found support in other States. It would then appear the part of wisdom to act without further delay, in order that public rights may be adjusted without appeal to the courts. This Commission offers a means to meet the emergency, since a remedy for an established nuisance is the sole desire of sufferers and the sole requirement of the courts.

METHODS OF SEWAGE TREATMENT.

Your Commission has given considerable attention to the various methods of sewage-disposal, during and previous to appointment, and is informed as to the more common methods in use in this country and in Europe. The frequent change in opinion of engineers as to the best methods of treatment is a notable feature of the development of the last few years. Since the subject was first reported upon in this State, the actual developments in scientific discovery have been considerable; yet it cannot be said that they are conclusive in any case.

It is plain to either engineer or to layman that if a quantity of sewage be disseminated in a body of water large enough, the harmful elements will disappear. Equally obvious is the fact that if the sewage be spread on a sufficient area of land and be mixed with earth in large proportion, the natural agencies will operate to purify the sewage. Or, we can take a quantity of sewage and pass it through ample beds of coarse sand and have an effluent which is sufficiently clean to cause no public nuisance and to do no harm to fish-life. Or, we can go a step further and prepare artificial filtration beds of small-sized coke and get a straining and aeration which may do better than the sand, if the area be well adjusted and sufficient rest is given between the applications. Or, it may be practicable to pass the sewage through filter-beds and by forcing air through filters get additional aeration, saving space and keeping up the efficiency of the filtering material.

Great sums of money have been spent upon chemical precipitation and treatment, but this system has been generally abandoned on account of its expense and the difficulty of caring for the matter when precipitated, the sludge.

A method of treatment which is now receiving more attention from sanitarians and engineers than any other is that commonly known as the septic tank system, or purification by bacterial action. Here the sewage is confined in large tanks from which air and light are excluded, and rapid bacterial action is developed, the natural processes of decay being enormously accelerated. The effect is not only to take from the sewage those parts which would cause a nuisance, but to actually consume a large portion of the solids. The discharge from the tank is passed through coke filter-beds, and it is claimed that the experiments have shown the final effluent to be free from deleterious properties. Tests have now been in progress for some time, especially in England, and the reports this year are increasingly favorable, not only as to effectiveness, but also as to economy. It is yet too early to decide definitely as to the merits of this method, but it appears to be along the lines of natural development, and it seems certain to provide one new method of meeting special cases.

Nearly all of these systems of treatment are applicable with economy and success only to house-sewage, and here is encountered one of the chief difficulties of providing suitable treatment locally, as the combined system of sewers, which includes surface drainage, so floods the fields or the machinery as to destroy the efficiency of the system.

Besides the more intricate methods of treatment, it has been found advisable in many cases to discharge crude sewage with the outgoing tides; or to provide tanks where, by slow flowage, the sewage would deposit solids, these to be removed by mechanical means, only fluids escaping. The views of engineers are almost as varied as their number, but it is safe to say that the wisest and best of their profession hesitate to prescribe any single remedy until after elaborate investigation, and that they are then often inclined to use more than one of the methods, all depending upon the necessities of the individual case.

In the works which the Commission has examined, either personally or by reports, few have remained the same for a long period of years. Constant improvement and sometimes radical change have been necessary in all the large works, and this applies to London, Manchester, Paris and Berlin, and scores of other European cities in some degree, as well as to cities of this country. And in all the necessity for great expenditure for the more complete purification of waste is becoming generally recognized. The great difficulty in this country has been to awaken the public to the necessity of large expenditures for efficient work, and until there is a fair realization of the impossibility of carrying away waste without expending much money in the carriage and disposal, the requisite health measures will be delayed. The city of Chicago is now spending the last of thirty-two millions of dollars in an effort to remedy its foul conditions, and while the system adopted has been criticised, the courage of the public in pursuing a remedy at so great a cost commands admiration. Elsewhere in this country a similar willingness to meet this question and provide a remedy at large cost has been shown. If asked to define the special merit of systems abroad, your Commission would be inclined to reply that they are found in the disposition to require ample test and thorough investigation, and the cheerful concession by taxing authorities of the money necessary for experiment.

WILLIAM T. HUNT, *Chairman.*
JNO. HINCHLIFFE,
CHARLES W. FULLER,
CHAS. F. HARRINGTON,
DAVID L. WALLACE.

APPENDIX.

THE PASSAIC RIVER AND TYPHOID.

During the extreme cold weather of 1899, it appeared necessary to the city of Newark to supplement its supply of water for domestic purposes by pumping an additional supply from the Passaic river. An outbreak of typhoid fever and intestinal diseases followed, and in the months of March, April and May, 1899, 395 cases of typhoid had developed in the city, as against eight in the same three months of the year 1898. There were fifty deaths from typhoid in March, April and May, 1899, as compared with one in the same months of 1898. The Board of Health of Newark also reported "numerous cases of diarrhœa and dysentery, intractable to ordinary treatment, a considerable number of which terminated fatally."

The quantity of Passaic river water pumped during the period of threatened water famine, February 13 to 18, 1899, was 63,000,000 gallons, while the total quantity used in the city during that time was 218,000,000 gallons. The poisonous character of the water of the Passaic at a time of the year when its noxious quality was likely to be rather less than usual, was thus shockingly demonstrated. If the proportion of the water used in this case produced such results, it is not unreasonable to presume that disease and death are caused not infrequently by uses of the water not connected with the public supply. Boys still venture in the foul waters in the bathing season, and along the river front the water is occasionally used in washing and for other purposes. Since it is so heavily laden with disease germs it seems impossible that those near it should escape infection. This peril is in addition to the recognized evils which arise from the stench, the effect of which was so nauseating at times as to cause manufacturers to seriously contemplate the desirability of seeking other locations, to escape the annoyance and injury from illness to their employees, due to this cause.

Sewerage Reports

OF THE

Several Cities, Townships, Towns, Boroughs and Villages

IN THE

STATE OF NEW JERSEY,

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SEWERAGE REPORTS.

FORM OF BLANKS.

SEWERAGE REPORT

Of the.....County of.....in the State of New Jersey.

1. Population by the last United States census.....
2. Estimated population at present time.....
3. Character of population. Manufacturing, urban or suburban?.....
4. Topographical character. Hilly, undulating or flat?.....
5. Supply of water. By gravity or pumping?.....
6. Estimated consumption of water per diem for each inhabitant.....
7. Sewerage or none?.....
8. (*a*) Is sewerage combined, separate, or both?.....
   (*b*) If both, how much of each?.....
9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year.....
10. (*a*) Are the present sewers adequate for storm service?.....
    (*b*) If not, is the enlargement of the sewers under contemplation?.....
11. (*a*) Number of miles of sewers of combined system.....
    (*b*) Number of silt basins.....
    (*c*) Miles of brick sewer and miles of pipe sewer, with sizes.....
12. If combined system is in use, is provision made for ground-water entering sewers?.....
13. If separate system is in use—
    (*a*) The number of miles of pipe, with sizes.....
    (*b*) Number of manholes, with average distance between manholes.....
    (*c*) Are all sewers straight, both in line and grade between manholes? .....
    (*d*) Does ground-water enter into the sewers?.....
    (*e*) If so, what proportion of ground-water to sewage flows into the pipes?.....
14. Are the sewers kept carefully clean?.....
15. (*a*) Are sewers concentrated into one point of discharge or not?.....
    (*b*) If so, where?.....
    (*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge.....

16. (*a*) Is there any treatment of sewage before discharge?.....

(*b*) If so, what?.....

(*c*) Are there any storage tanks?.....

17. (*a*) Do all the sewers flow by gravity?.....

(*b*) If not, state in what area the sewage is pumped and the number gallons of sewage delivered at the pump, and the amount daily pumped.....

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one.....

19. Is there a complete system of inspection, care and maintenance of the sewers?.....

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties?.....

(*b*) And if so are the latter duly licensed?.....

21. What is the charge for tapping the sewers?.....

22. Number of house connections.....

23. Number of factory connections..... .....

24. Number of other connections.....

25. If not known separately, number of total connections.....

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September.....

27. If the sewage is subjected to treatment for its purification before final discharge, has the result of purification been satisfactory?.....

GENERAL REMARKS.

.....

.....

REPORTS.

ATLANTIC COUNTY.

TOWN OF ABSECON.

No sewers.

CITY OF ATLANTIC CITY.

Water-supply. Sewers. No report filed.

CITY OF BRIGANTINE.

No water-supply. No sewers.

TOWNSHIP OF BUENA VISTA.

No report. No sewers.

CITY OF EGG HARBOR CITY.

Water-supply furnished by the Egg Harbor City Water Company, obtained from driven wells. No sewers, excepting two open drains, one about one and one-quarter miles in length, and one about one-third of a mile in length.

TOWNSHIP OF EGG HARBOR.

No sewers.

TOWNSHIP OF GALLOWAY.

No sewers.

TOWNSHIP OF HAMILTON.

Estimated population, 1,500. No water-supply. No sewers, excepting terra cotta pipe for surface drainage in the streets of Mays Landing. There is a sewer from the public buildings of Mays Landing to the river maintained by the County Board of Freeholders.

TOWN OF HAMMONTON.

No sewers. No water-supply.

BOROUGH OF LINWOOD.

No sewers. No water-supply.

BOROUGH OF LONGPORT.

Summer resort. Water supplied by pumping. Estimated consumption of water per diem for each inhabitant, 80 gallons. Separate sewer system controlled by the Longport Water and Light Company, consisting of between one and two miles of six and eight-inch pipe, emptying at 11 points of discharge into beach thoroughfare. No treatment of sewage. Sewers flow by gravity. 31 house connections.

TOWNSHIP OF MULLICA.

No sewers.

BOROUGH OF PLEASANTVILLE.

No sewers. No water-supply.

BOROUGH OF SOMERS POINT.

No sewers.

BOROUGH OF SOUTH ATLANTIC CITY.

No sewers. No water-supply.

TOWNSHIP OF WEYMOUTH.

No sewers. No water-supply.

BERGEN COUNTY.

BOROUGH OF ALLENDALE.

No sewers. No water-supply.

TOWNSHIP OF BERGEN.

No sewers.

BOROUGH OF BERGENFIELD.

No sewers. Water supplied by the Hackensack Water Company to about twenty houses.

BOROUGH OF BOGOTA.

No report.

BOROUGH OF CARLSTADT.

Water supplied by pumping. No sewers, excepting about 1,800 feet of pipe for storm service on steep grades.

BOROUGH OF CLIFFSIDE PARK.

No report. Private sewers.

BOROUGH OF CRESSKILL.

No sewers.

BOROUGH OF DUMONT.

No sewers. Water supplied by pumping.

BOROUGH OF DELFORD.

No water-supply. Two private sewers laid by permission of borough authorities, with about 35 house connections, emptying into Hackensack river at one point of discharge.

BOROUGH OF EAST RUTHERFORD.

Water pumped from upper Hackensack river. Estimated consumption 118 gallons per diem for each inhabitant. No sewers, excepting for storm service emptying into Hackensack meadows and Passaic river. Advisability of building sewers is being considered.

BOROUGH OF EDGEWATER.

Water supplied by the Hackensack Water Company. About three miles of private sewers, with basins on streets. One mile of 18-inch pipe, one-half mile of 6-inch pipe, and a mile and a half of 20-inch pipe. These sewers empty into the Hudson river. One of them drains part of Cliffside Park borough.

CITY OF ENGLEWOOD.

Water-supply by Hackensack Water Company. Sewer system under control of Englewood Sewerage Company. About fourteen miles of separate sewers for house drainage only, consisting of six, eight and twelve-inch pipe, flowing by gravity, and discharging at one place in Overpeck creek, one and a half miles below the city. About 512 houses are connected with the sewers. Sewage is not treated before discharge.

BOROUGH OF ENGLEWOOD CLIFFS.

No sewers.

BOROUGH OF FAIRVIEW.

No sewers.

TOWNSHIP OF FRANKLIN.

No sewers.

BOROUGH OF GARFIELD.

Water-supply obtained from artesian wells. No sewers, excepting 900 feet of twenty-four inch pipe laid by the Saddle River Traction

Company and Erie Railroad Company to drain their underground crossing, emptying into the Passaic river. Connections from private drains with this drain are contemplated.

BOROUGH OF GREEN ROCK.

No sewers.

TOWNSHIP OF HARRINGTON.

No sewers.

BOROUGH OF HASBROUCK HEIGHTS.

Water supplied by pumping. No sewers.

TOWNSHIP OF HILLSDALE.

No sewers. No water-supply.

TOWNSHIP OF HOHOKUS.

No report.

BOROUGH OF LEONIA.

Water supplied by Hackensack Water Company. About 7,000 feet of separate sewers for house drainage only, owned by private companies. The Leonia Sewer Company owns about 4,000 feet of six-inch sewer pipe, emptying into Overpeck creek at one place of discharge. There are 35 house connections. The company charges its members, who must be stockholders and own two $25-shares of stock, a yearly rental of $3. The Central Sewer Company owns about 3,000 feet of six-inch pipe, having twenty house connections, and emptying at one point of discharge into Overpeck creek. The company charges a yearly rental of $12 per house.

In neither case is the sewage treated before discharge.

BOROUGH OF LITTLE FERRY.

No report.

BOROUGH OF LODI.

Water supplied by pumping. Estimated consumption per diem for each inhabitant, 30 gallons. No sewers.

TOWNSHIP OF LODI.

Water supply obtained from artesian wells. No sewers.

BOROUGH OF MAYWOOD.

No sewers.

TOWNSHIP OF MIDLAND.

No sewers.

BOROUGH OF MIDLAND PARK.

No water-supply. No sewers.

BOROUGH OF MONTVALE.

No sewers.

TOWNSHIP OF NEW BARBADOES.

VILLAGE OF HACKENSACK.

2. Estimated population at present time—9,000.

3. Character of population—manufacturing, urban or suburban? Suburban.

4. Topographical character—Partly flat and partly hilly.

5. Supply of water—by gravity or pumping? Pumping.

7. Sewerage or none—Sewerage.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use the number of miles of streets paved and unpaved, and the annual amount of paving done per

year—About twenty-one miles paved and about twenty-three miles unpaved; about one and one-half miles of macadam put down annually.

10. (*a*) Are the present sewers adequate for storm service? Yes, with few exceptions.

(*b*) If not, is the enlargement of the sewers under contemplation? Not at present.

11. (*a*) Number of miles of sewers of combined system—About thirteen miles.

(*b*) Number of silt basins—About 212.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—Brick, about five miles; two feet to six and one-half feet diameter; about eight miles pipe, twenty-four inches by eight inches.

12. If combined system is in use, is provision made for ground-water entering sewers? Yes.

13. (*b*) Number of manholes, with average distance between manholes—Number unknown; distance apart varies from 100 feet to 200 or 200 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes, as a rule.

(*d*) Does ground water enter into the sewers? Yes.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various point of discharge state how many and into what places do the various outlets discharge. Five main outlets discharge in the Hackensack river.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers. No.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Made by outside parties.

(*b*) And if so are the latter duly licensed? No.

21. What is the charge for tapping the sewers? No charge for tapping—a charge of $2 is made to cover expenses of inspector of work in streets.

THE HACKENSACK IMPROVEMENT COMMISSION,
per M. E. Clarendon, President.

BOROUGH OF NORTH ARLINGTON.

No sewers.

TOWNSHIP OF ORVIL.

No sewers.

BOROUGH OF OLD TAPPAN.

Estimated population 300. No water-supply. No sewers.

TOWNSHIP OF OVERPECK.

Water supplied by pumping—About ¼ of a mile of sewer, with about 60 house connections, and private sewers with about 20 house connections, all emptying into Hackensack river, without treatment. New sewer system contemplated.

TOWNSHIP OF PALISADE.

No sewers.

BOROUGH OF PARK RIDGE.

No water-supply. No sewers.

BOROUGH OF RIDGEFIELD.

Water supplied by pumping. Private sewer for house drainage only, having about 3,170 feet of eight-inch pipe and 1,500 feet of six-inch pipe, and discharging at one point into an open ditch on the Hackensack meadows. Sewage is not treated before discharge. Thirty-seven houses are drained by this sewer.

TOWNSHIP OF RIDGEFIELD.

No sewers. Water main being laid and sewers contemplated.

TOWNSHIP OF RIDGEWOOD.

No report.

BOROUGH OF RIVERSIDE.

No water-supply. No sewers.

BOROUGH OF RUTHERFORD.

1. Population by the last United States census—2,280.

2. Estimated population at present time—5,000.

3. Character of population. Manufacturing, urban or suburban? Suburban.

4. Topographical character. Hilly, undulating or flat? Hilly.

5. Supply of water. By gravity or pumping? Source, Upper Hackensack river; by pumping and gravity.

6. Estimated consumption of water per diem for each inhabitant—118 gallons, approximate.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate system, one combined sewer, 1,800 feet long, 18-inch pipe (cement).

(*b*) If both, how much of each? (Length about 13¼ miles pipe.) The separate system, size of pipe 2 feet to 6-inches in diameter (proportioned).

9. If combined sewerage is in use, the number of miles of streets paved and unpaved and the annual amount of paving done per year? Approximately, 15 miles macadam pavement, 8 miles graded and unpaved; about 1½ miles macadam laid since '95.

10. (*a*) Are the present sewers adequate for storm service? No.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—None.

(*b*) Number of silt basins—Seventeen (17).

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—Brick drain for storm-water (not sewer), 1,200 feet; miles pipe, sewer, about 12½, various sizes, 2 feet to 6 inches.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—12½, from 6 inches to 2 feet (proportioned as required).

(*b*) Number of manholes, with average distance between manholes—Two hundred (200), about 350 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes, small quantity.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Between 1 and 2 per cent.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge state how many and into what places do the various outlets discharge—Three outlets into Passaic river, and one outlet into Berry's creek.

16. (*a*) Is there any treatment of sewage before discharge? None.

(*c*) Are there any storage tanks? None.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet if only one, and the daily discharge of the various outlets if more than one—Berry's creek or eastern outlet, 166,855 gallons. Passaic river outlets: Woodward avenue outlet, 33,075 gallons; Pierrepont avenue outlet, 38,050 gallons; Rutherford avenue outlet, 2,235 gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes, but incomplete.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Connections are made by local licensed plumbers.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? Twelve cents per foot frontage of buildings, except large buildings where an unusual amount of sewage enters sewers, in which case a special charge is made by the mayor and council.

22. Number of house connections—Five hundred and twenty-six (526).

25. If not known separately, number of total connections—526.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September.—Respectfully refer you for this answer to the East Jersey Water Company.

WISE & WATSON,
Borough Engineers.

BOROUGH OF SADDLE RIVER.

No sewers.

TOWNSHIP OF SADDLE RIVER.

No report.

TOWNSHIP OF TEANECK.

No sewers.

BOROUGH OF TENAFLY.

No sewers.

TOWNSHIP OF UNION.

No sewers.

BOROUGH OF UPPER SADDLE RIVER.

No water-supply. No sewers.

BOROUGH OF WALLINGTON.

Estimated population, 1,500. No sewers.

TOWNSHIP OF WASHINGTON.

No sewers.

BOROUGH OF WESTWOOD.

Water supplied by pumping. No sewers.

BOROUGH OF WOODCLIFF.

No sewers.

BOROUGH OF WOODRIDGE.

No report.

BURLINGTON COUNTY.

TOWNSHIP OF BASS RIVER.

No sewers.

TOWNSHIP OF BEVERLY.

No water-supply. No sewers.

CITY OF BEVERLY.

Water supplied by pumping from Delaware river. No sewers except private drains empting into the Delaware river near the pumping station, endangering water-supply.

TOWNSHIP OF BORDENTOWN.

No sewers.

TOWNSHIP OF BURLINGTON.

No sewers.

CITY OF BURLINGTON.

No report.

TOWNSHIP OF CHESTER.

No sewers. Water supplied by pumping.

TOWNSHIP OF CHESTERFIELD.

No sewers.

TOWNSHIP OF CINNAMINSON.

No sewers.

TOWNSHIP OF DELRAN.

No sewers.

TOWNSHIP OF EASTAMPTON.

About 1,000 feet of private sewers for house and storm drainage, emptying into Rancocas creek.

TOWNSHIP OF EVESHAM.

No sewers.

BOROUGH OF FIELDSBORO.

No water-supply. No sewers.

TOWNSHIP OF FLORENCE.

No sewers.

TOWNSHIP OF LUMBERTON.

No sewers.

TOWNSHIP OF MANSFIELD.

No sewers.

TOWNSHIP OF MEDFORD.

No sewers.

TOWNSHIP OF MOUNT LAUREL.

No report.

TOWNSHIP OF NEW HANOVER.

No sewers.

TOWNSHIP OF NORTHAMPTON.

No report.

TOWNSHIP OF PALMYRA.

No sewers.

BOROUGH OF PEMBERTON.

Water-supply and sewers under control of private company. Water supplied by pumping. About one-half mile of ten-inch terra cotta pipe for house drainage only, having 12 house connections, discharging a small amount of sewage on the open meadow without treatment.

TOWNSHIP OF RIVERSIDE.

No sewers. Water supplied by pumping, used by part of the township.

BOROUGH OF RIVERTON.

Water-supply furnished by private company by pumping. One separate sewer for house drainage only, having 77 house connections, in length about one-half mile, composed of one-quarter of a mile of six-inch pipe and one-quarter of a mile of ten-inch pipe, emptying without treatment into the Delaware river. Further sewers have been contemplated, but plans were defeated at an election held this year.

TOWNSHIP OF SHAMONG.

No report.

TOWNSHIP OF SPRINGFIELD.

No report.

TOWNSHIP OF SOUTHAMPTON.

No sewers.

TOWNSHIP OF WASHINGTON.

No sewers.

TOWNSHIP OF WESTAMPTON.

No sewers.

TOWNSHIP OF WILLINGBORO.

No report.

TOWNSHIP OF WOODLAND.

No report.

CAMDEN COUNTY.

CITY OF CAMDEN.

1. Population by the last United States census—58,313.

2. Estimated population at present time—76,220. Police count, 1899.

3. Character of population, manufacturing, urban or suburban? Urban and suburban.

4. Topographical character. Hilly, undulating or flat? Three-quarters flat, balance hilly.

5. Supply of water. By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant—200.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use the number of miles of streets paved and unpaved, and the annual amount of paving done per year? Paved, 53 miles. Unpaved, about 115 miles. About 3 miles.

10. (*a*) Are the present sewers adequate for storm service? Yes.

11. (*a*) Number of miles of sewers of combined system—52.

(*b*) Number of silt basins—700.

(*c*) Feet of brick sewer and miles of pipe sewer, with sizes—6′, 5,000; 5′, 9,000; 4½′, 2,000; 4′, 22,000; 3½′, 1,000; 3′, 800,000; 2′, 40,000; 2 x 3, 30,000; 20″ x 30″, 75,000; 16″ x 24″, 8,000.

12. If combined system is in use is provision made for ground-water entering sewers? Yes.

13. If separate system is in use—

(*b*) Number of manholes, with average distance between manholes—About 1,150. 250 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Roughly, one-third of sewers, none; balance, 5 to 10 per cent. dry-weather flow.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—11 into Delaware river, 1 into Little Newton creek, 3 into Cooper's creek.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Dry weather, from 500,000 to 2,000,000 gallons.

19. Is there a complete system of inspection, care and maintenance of sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Plumbers (licensed), under inspection.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? None direct charged for street openings (all kinds).

22. Number of house connections—No account previous to September, 1888.

23. Number of factory connections—Since that date, 8,033.

24. Number of other connections—Connections all kinds.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September? (See State Report, Water Delaware River.) All outlets on tidal streams; tide rises $5\frac{8}{10}$ feet.

TOWNSHIP OF CENTRE.

No report.

BOROUGH OF CHESILHURST.

No sewers.

BOROUGH OF COLLINGSWOOD.

No sewers. A sewer system is contemplated.

TOWNSHIP OF DELAWARE.

No sewers.

TOWNSHIP OF GLOUCESTER.

No sewers.

CITY OF GLOUCESTER.

No report.

TOWNSHIP OF HADDON.

No sewers. A sewer system is contemplated for part of the township.

BOROUGH OF MERCHANTVILLE.

No sewers. Water supplied from artesian wells by the Merchantville Water Company.

TOWNSHIP OF PENSAUKEN

No sewers.

TOWNSHIP OF WATERFORD.

No sewers.

TOWNSHIP OF WINSLOW.

No sewers.

CAPE MAY COUNTY.

BOROUGH OF ANGLESEA.

No sewers.

BOROUGH OF AVALON.

1. Population by the last United States census, 146.

3. Character of population—Suburban.

4. Topographical character—Flat.

5. Supply of water. By gravity or pumping? Pumping to an elevated tank 85 feet high.

7. Sewerage or none. Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate, all terra cotta pipe.

10. (*a*) Are the present sewers adequate for storm service? No surface drainage.

11. (*c*) Miles of brick sewer and miles of pipe sewer, with sizes—1,700 feet 10-inch, 2,250 feet 8-inch, 9,035 feet 6-inch, and 1,900 feet 4-inch, all terra cotta pipe.

13. (*b*) Number of manholes with average distance between manholes—15 manholes about 600 feet apart.

(*c*) Are all sewers straight both in line and grade between manholes? Yes.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes, by flushing.

15. (*a*) Are sewers concentrated into one point of discharge or not? Two points of discharge.

(*b*) If so, where? Tidewater (saltwater) stream in rear.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? The borough supervises the connections.

21. What is the charge for tapping the sewers? None.
22. Number of house connections—15.

BOROUGH OF CAPE MAY CITY.

Water supplied by pumping. Combined sewerage system consisting of eight miles of pipe, emptying into creeks at various points of discharge on the east and west sides of the city without treatment, and having between three and four hundred house connections.

TOWNSHIP OF DENNIS.

No sewers under control of township committee.

BOROUGH OF HOLLY BEACH CITY.

No sewers.

LOWER TOWNSHIP.

No sewers.

MIDDLE TOWNSHIP.

No sewers, excepting an 8-inch terra cotta pipe for surface drainage at Cape May Court House.

BOROUGH OF OCEAN CITY.

Water supplied by gravity. About 5 miles of separate sewer pipe, consisting of 4-inch, 6-inch, 8-inch and 10-inch mains, discharging in 3 places, at Third, Seventh and Eleventh streets, into Great Egg Harbor bay without treatment, having about 300 house connections and controlled by Ocean City Sewer Company.

BOROUGH OF SEA ISLE CITY.

No report.

BOROUGH OF SOUTH CAPE MAY.

No sewers.

UPPER TOWNSHIP.

Sewer system owned by private corporation. No report as to details.

BOROUGH OF WEST CAPE MAY.

No sewers. No water-supply.

BOROUGH OF WILDWOOD.

Water supplied by pumping. Estimated consumption per diem for each inhabitant, 30 gallons. Separate sewer system, consisting of about 2 miles of 12, 10, 8 and 6-inch pipe, emptying into a vault, with overflow outlet into tide-water, without treatment.

CUMBERLAND COUNTY.

CITY OF BRIDGETON.

1. Population by the United States census—13,600.
2. Estimated population at present time—14,000.
3. Character of population—Manufacturing, urban and suburban.
4. Topographical character—Undulating.
5. Supply of water. By gravity or pumping? Pumping.
6. Estimated consumption of water per diem for each inhabitant—60 gallons.
7. Sewerage or none—Partly.
8. (*a*) Is sewerage combined, separate or both? Combined.
9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—No paved streets.
10. (*a*) Are the present sewers adequate for storm service? No.
    (*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—24,066 feet..

(*c*) Miles of brick sewers and miles of pipe sewer with sizes—Two-foot brick storm-water sewers, 4,275 feet. Eight and ten-inch pipe sewers, 19,791 feet. Eight-inch flush pipes put at all street crossings.

(*c*) Are all sewers straight both in line and grade between flush pipes? No.

(*d*) Does ground water enter into the sewers? A small percentage from imperfect joints.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge. Ten—in Cohansey river.

16. (*a*) Is there any treatment of sewage before discharge? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers. Not yet.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Plumbers, under the care of Superintendent of Sewers and Board of Health.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? $25.00.

25. Total number of connections? 293.

TIMOTHY WOODRUFF,
Superintendent of Sewers.

TOWNSHIP OF COMMERCIAL.

No report.

TOWNSHIP OF DEERFIELD.

No sewers.

TOWNSHIP OF DOWNE.

No sewers.

TOWNSHIP OF FAIRFIELD.

No sewers.

TOWNSHIP OF GREENWICH.

No water-supply. No sewers.

TOWNSHIP OF HOPEWELL.

No report.

TOWNSHIP OF LANDIS.

No water supply. No sewers.

TOWNSHIP OF LAWRENCE.

No sewers.

TOWNSHIP OF MAURICE RIVER.

No sewers.

CITY OF MILLVILLE.

No sewers, excepting 500 feet of six-inch pipe emptying into Maurice River township. New sewers are contemplated.

TOWNSHIP OF STOW CREEK.

No sewers.

BOROUGH OF VINELAND.

No sewers. Plans have been drawn for a sewerage system. Water supplied by pumping.

ESSEX COUNTY.

TOWNSHIP OF BELLEVILLE.

Water-supply obtained from Newark reservoir. No sewers.

TOWNSHIP OF BLOOMFIELD.

1. Population by the last United States census—7,708, including Glen Ridge.

2. Estimated population at present time—10,000.

3. Character of population. Manufacturing, urban or suburban? Mixed. Partly manufacturing and partly suburban.

4. Topographical character. Hilly, undulating or flat—Undulating.

5. Supply of water. By gravity or pumping? Gravity, furnished by Orange Water Company from the East Jersey mains.

6. Estimated consumption of water per diem for each inhabitant—70 gallons. About 400,000 gallons per day for township.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate.

10. (*a*) Are the present sewers adequate for storm service? No.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—20-inch, 7,099.6 feet; 15-inch, 2,851.3 feet; 12-inch, 2,268.3 feet; 10-inch, 17,209.9 feet; 8-inch, 87,057.0 feet. Total, 116,486.1 feet or 22.06 miles.

(*b*) Number of manholes, with average distance between manholes—378 manholes and 85 flush-tanks, 260 feet apart.

(*c*) Are all sewers straight both in line and grade between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Varying with season.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Three. Newark avenue, near Aqueduct; Franklin and Orange streets; Montgomery street and Morton street into the Union outlet sewer.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? Not in Bloomfield.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Franklin street, 1,440,000 gallons; Newark avenue, 20,000 gallons; Montgomery street, about 50,000 gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Licensed contractor.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $25.00, including connection.

22. Number of house connections—397.

23. Number of factory connections—8.

General Remarks.

The sewerage of Bloomfield runs into the joint outlet sewer which takes the sewerage of the city of Orange, town of Montclair, borough of Glenridge and township of Bloomfield. This joint outlet sewer begins at Newark avenue and Franklin street, and runs through Bloomfield, Belleville and the city of Newark to the Passaic river at a point near the Greenwood Lake railroad bridge. There is a storage tank on this outlet sewer.

JAS. OWEN,
Township Engineer.

TOWNSHIP OF CALDWELL.

No water-supply. No sewers, excepting a small private water and sewer system in southeast part of the township.

BOROUGH OF CALDWELL.

No water-supply. No sewers.

TOWNSHIP OF CLINTON.

No sewers. The city of Newark has been granted permission to lay 600 feet of sewer through the township to drain a small section.

TOWNSHIP OF EAST ORANGE.

1. Population by the last United States census—14,000.

2. Estimated population at present time—20,000.

3. Character of population. Manufacturing, urban or suburban? Suburban.

4. Topographical character. Hilly, undulating or flat? Undulating.

5. Supply of water. By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant—About eight gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate, or both? Separate.

(*b*) If both, how much of each? 40 miles pipe sewer, 1½ miles storm-water brick and pipe drains.

10. (*a*) Are the present sewers adequate for storm service? Sewers not used for storm service.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*b*) Number of silt basins—Forty-two.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—For miles, see above. Sizes from 4½ feet, brick, to 8 inches pipe.

12. If combined system is in use, is provision made for ground-water entering sewers? Provision for ground-water entering in storm drains.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—Forty miles; from 15 inches to 8 inches.

(*b*) Number of manholes with average distance between manholes—Seven hundred; about 300 feet between them.

(*c*) Are all sewers straight, both in line and grade between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Probably.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? We have no means of telling.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Concentrated.

(*b*) If so, where? Into 6th Avenue sewer, Newark.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—Estimated at one million gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? City.

21. What is the charge for tapping the sewers? Twenty dollars, which includes material and labor to carry the house connection to the street line.

22. Number of house connections—Twenty-eight hundred.

23. Number of factory connections—Two.

September 20th, 1899.

EDWARD E. BRUEN,
Township President.

TOWNSHIP OF FRANKLIN.

No sewers.

BOROUGH OF GLEN RIDGE.

1. Population by the last United States census—Not separately enumerated. A part of Bloomfield at that time.

2. Estimated population at present time—1,800 to 2,000.

3. Character of population—Manufacturing, urban or suburban? Suburban.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Gravity.

6. Estimated consumption of water per diem for each inhabitant—100 gallons (as we sprinkle our streets throughout, much of this never reaches our sewers).

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate, or both? Separate.

10. (*b*) If not, is the enlargement of the sewers under contemplation? No.

13. Is separate system in use—No.

(*a*) The number of miles of pipe, with sizes—26,727 feet, 8-inch; 2,600 feet, 20-inch. Montclair outlet runs through to Bloomfield.

(*b*) Number of manholes with average distance between manholes—108-250 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Six points; three in main outlet for Montclair and Bloomfield and three in Bloomfield system.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—The borough pays 29 per cent. of the cost of maintaining joint outlet.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $5.00.

22. Number of house connections—215.

TOWN OF IRVINGTON.

No sewers.

TOWNSHIP OF LIVINGSTON.

No sewers.

TOWNSHIP OF MILLBURN.

Estimated population—3,000. Water supplied by pumping. No sewers owned by township.

TOWN OF MONTCLAIR.

1. Population by the last United States census—8,656.

2. Estimated population of present time—14,000.

3. Character of population. Manufacturing, urban or suburban? Suburban.

4. Topographical character. Hilly, undulating or flat? Hilly. Mountain slope.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant? 70 gallons. Amount consumed, 1,000,000 gallons per day.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate.

10. (*a*) Are the present sewers adequate for storm service? No.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—10-in., 1.24 miles; 12-in., 1.8 miles; 15-in., 2.26 miles; 20-in., 1.15 miles; 24-in., 1.43 8-in., 21.26 miles; total, 29.10.

(*b*) Number of manholes with average distance between manholes—414. 320 feet apart.

(*c*) Are all sewers straight both in line and grade between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Varying with the dryness of season.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes, into the joint outlet sewer, Franklin street and Newark avenue, Bloomfield.

(*b*) If so, where? Then to the Passaic river at North Newark.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? Not on the Montclair system.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—Discharge from Montclair at town line, average 2,142,400 gallons per day.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Licensed.

21. What is the charge for tapping the sewers? Five dollars.

22. Number of house connections—1212.

23. Number of factory connections—One.

24. Number of other connections—Five barns.

General Remarks.

The sewerage of Montclair runs into the joint outlet sewer which takes the sewerage of the city of Orange, town of Montclair, borough of Glenridge and township of Bloomfield. This joint outlet sewer begins at Newark avenue and Franklin street, and runs through Bloomfield, Belleville and the city of Newark to the Passaic river at a point near the Greenwood Lake Railroad Bridge. There is a storage tank on this outlet sewer.

JAS. OWEN,
Town Surveyor.

CITY OF NEWARK.

1. Population by the last United States census—181,518, in the year 1890.

2. Estimated population at present time—255,000 in 1898.

3. Character of population—Manufacturing, urban or suburban? Manufacturing, urban.

4. Topographical character—Hilly, undulating or flat? About 13 square miles are hilly, and 6 square miles are flat (meadow land).

5. Supply of water. By gravity or pumping? By gravity.

6. Estimated consumption of water per diem for each inhabitant —One hundred gallons.

7. Sewerage or none—Sewerage.

8. (*a*) Is sewerage combined, separate or both? Mostly all on the combined system.

(*b*) If both, how much of each? 138 miles of the combined, and 6 miles of the separate system.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year —102 miles of paved streets. Average rate of increase per year, within the past ten years, six miles.

10. (*a*) Are the present sewers adequate for storm service? Not in all instances.

(*b*) If not is the enlargement of the sewers under contemplation? Yes.

11. (*a*) Number of miles of sewers of combined system—138 miles.

(*b*) Number of silt basins—Twenty-five hundred.

(*c*) Miles of brick sewer and miles of pipe sewer with sizes—58 miles of brick sewers, varying from 2½ to 9 feet in diameter; 86 miles of pipe sewer, ranging from 8″ to 36″ in diameter.

12. If combined system is in use, is provision made for ground-water entering sewers? Formerly several courses of brick were laid without cement-mortar in the bottom of sewers; not any more.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—6 miles, 8 to 15 inches diameter.

(*b*) Number of manholes, with average distance between manholes—About 4,400; average distance apart, 175 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Quite generally they are.

(*d*) Does ground-water enter into the sewers? Yes, by seepage through brickwork and pipe-joints.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? The ratio is unknown.

14. Are the sewers kept carefully clean? Quite clean.

15. (*a*) Are sewers concentrated into one point of discharge or not? They are not.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—8 main-sewers discharge into Passaic river (not including the joint outlet-sewer of Orange, Montclair and Bloomfield), and 6 sewers into an intercepting sewer, which discharges into Newark bay.

16. (*a*) Is there any treatment before discharge? There is none.

(*c*) Are there any storage tanks? On the Orange outlet-sewer.

17. (*a*) Do all the sewers flow by gravity? Yes, but on the intercepting sewer there is a lift.

(*b*) If not, state in what area the sewage is pumped and the number of gallons of sewage delivered at the pump and the amount daily pumped—Area which contributes sewage to the intercepting sewer, about 3,000 acres; dry-weather flow in 1898, 5 million gallons per day; average, 12 million gallons and maximum 23 million gallons (the two last-mentioned quantities contain rain-water).

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—Forty million gallons into the Passaic river (not including discharge from joint outlet sewer of Orange, &c.), five million gallons into intercepting sewer. Both quantities contain more or less ground-water, and the first an overflow of the Branch Brook park, ranging from two to ten million gallons per day. This forty millions includes sewage from East Orange, carried through the Mill Brook sewer of Newark and discharging at the Clay street bridge. This was 5,500,000 gallons in twenty-four hours, March 24th, 1899.

19. Is there a complete system of inspection, care and maintenance of the sewers? Not to perfection.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties, plumbers or their employes.

(*b*) And if so, are the latter duly licensed? The plumbers are.

21. What is the charge for tapping the sewers? For an ordinary sized dwelling-house on a twenty-five or thirty-foot lot, $10.

25. If not known separately, number of total connections—25,400.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—"The area of the Passaic river water-shed, above the Centre street bridge, is 940 square miles. The average discharge from this area, in the dryest month of an average year, is 397 cubic feet per second, or 257,000,000 gallons per day; and in the wettest month of the same year, 2,372 cubic feet per second, or 1,537,000,000 gallons per day.

"The lowest discharge, in the dryest period observed in the past twenty years, would give 178 cubic feet per second, or 115,000,000 gallons per day, and the greatest freshet of the century, in 1882, about 21,000 cubic feet per second, or 13,608,000,000 per day. There is also a tidal flow passing at Centre street bridge amounting to 3,148 cubic feet per second, or 2,039,000,000 gallons per day." [Abstract

from written testimony of Edlow W. Harris, in the case between Marcus Sayre, et al. and the City of Newark, 1898.]

Remarks.

I would consider the construction of a main intercepting sewer along the shore of the Passaic river the most advantageous method of relieving this river from its pollution, such as was recommended by the Passaic Valley Sewerage Commissioners in their report of February, 1897, in view of the ill-success of the municipalities of East Orange and Summit with a chemical treatment of the sewage and an intermittent filtration.

Respectfully,

ERNEST ADAM,

Engineer of Street and Sewer Departments.

BOROUGH OF NORTH CALDWELL.

No report.

CITY OF ORANGE.

1. Population by the last United States census, 1890—18,844; State, 1895—22,792.

2. Estimated population at present time—25,000.

3. Character of population. Manufacturing, urban or suburban? Manufacturing and suburban.

4. Topographical character. Hilly, undulating or flat? Undulating.

5. Supply of water. By gravity or pumping? Gravity; about to install pumping plant.

6. Estimated consumption of water per diem for each inhabitant—34 gallons per capita.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate system.

10. (*a*) Are the present sewers adequate for storm service? Yes.

11. (*b*) Number of silt basins. Ninety-one.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes. Two and eighty-three hundredths miles brick sewer; thirty-three and thirty-four hundredths miles pipe sewer.

12. If combined system is in use, is provision made for ground-water entering sewers? Combined system not in use.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—See "Remarks." This does not include outlet sewer outside city boundary.

(*b*) Number of manholes, with average distance between manholes—For number manholes see "Remarks." Average distance between manholes—About 300 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? They are on pipe sewers.

(*d*) Does ground-water enter into sewers? Yes, leakage.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Unknown.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? They are.

(*b*) If so, where? Second river at northerly city boundary and East Orange.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—There is one outlet sewer, 24-inch pipe, following the Second river valley through East Orange and Bloomfield to the junction of Newark avenue and Franklin street, Bloomfield, where the 24-inch outlet for Bloomfiled, Glen Ridge and Montclair join. The combined flow is carried by a 2 foot 4-inch by 3 foot 10-inch, egg-shape, brick sewer via the Second river valley to a storage tank on the south bank of said river between Summer avenue and Washington avenue, Newark, N. J. A 48-inch C. 1 pipe discharging into the Passaic river at the west end of the New York and Greenwood Lake Railroad bridge is controlled by a gate in a gate-house on the river bank, and the discharge is effected at the beginning of outgoing tide.

17. (*a*) Do all sewers flow by gravity? A portion, on the Rahway river, Orange Valley, is pumped.

(*b*) If not, state in what area the sewage is pumped, and the number of gallons of sewage delivered at the pump, and the amount daily pumped—230 acres. Amount of sewage pumped is about 500,000 gallons per day.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Varies between 2,000,000 and 3,000,000 gallons per day, according to wet and dry season, for the city of Orange only.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? City makes connections from the sewer to the curb.

(*b*) And if so, are the latter duly licensed?

21. What is the charge for tapping the sewers? $1 for permit for each dwelling, &c.

22. Number of house connections—2,412, August 31st, 1899.

23. Number of factory connections—14.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—I do not know the flow of Passaic river.

FRED. T. CRANE,
City Engineer.

Schedule of length and sizes of sewers:

Storm Sewers.

Brick sewers—11′ x 5′		.095	miles.
Circular—7′		1.061	"
"	6′6″	.251	"
"	6′	.531	"
"	5′6″	.232	"
"	4′6″	.275	"
"	4′	.109	"
"	3′6″	.224	"
"	3′	.005	"
"	2′9″	.047	"
		2.83	miles.
Pipe sewers—30″ vitrified pipe		.074	miles.
"	24″ "	.192	"
"	20″ "	.131	"
"	18″ "	.260	"
"	15″ "	.105	"
"	12″ "	.011	"
		.773	miles.

70 manholes.

House Sewers.

Pipe sewers—24″	vitrified pipe	.....	.176	miles.
" 20″	"	.....	1.379	"
" 18″	"	.....	1.577	"
" 15″	"	.....	1.083	"
" 12″	"	.....	.781	"
" 10″	"	.....	.725	"
" 9″	"	.....	.258	"
" 8″	"	.....	26.588	"
			32.567	miles.

675 manholes.

BOROUGH OF VAILSBURG.

Estimated population—2,600. Water supplied by gravity. Estimated consumption—34 gallons per day per capita. Sewer system considered

TOWNSHIP OF VERONA.

No sewers.

TOWNSHIP OF WEST ORANGE.

Estimated population—7,500. Water supplied by gravity. Estimated consumption—30 gallons per diem for each inhabitant. No sewers.

TOWNSHIP OF SOUTH ORANGE.

No sewers. Sewerage plan considered.

GLOUCESTER COUNTY.

BOROUGH OF CLAYTON.

Estimated population—2,000. Water-supply furnished to part of the borough under control of the American Pipe Company of Philadelphia. No sewers, excepting 2,000 feet of pipe, from six to twenty inches in size, for surface drainage only.

TOWNSHIP OF CLAYTON.

No sewers, excepting a few small terra-cotta pipes. Statistics not reported.

TOWNSHIP OF DEPTFORD.

No sewers.

TOWNSHIP OF ELK.

No sewers.

TOWNSHIP OF EAST GREENWICH.

No sewers.

TOWNSHIP OF FRANKLIN.

No report.

TOWNSHIP OF GLASSBORO.

No sewers. No water-supply.

TOWNSHIP OF GREENWICH.

Estimated population—2,000. No water-supply. 1,200 feet of 12-inch for surface drainage only, emptying into Mantua creek.

TOWNSHIP OF HARRISON.

No sewers.

TOWNSHIP OF LOGAN.

No sewers.

TOWNSHIP OF MANTUA.

No sewers.

TOWNSHIP OF MONROE.

No report.

TOWNSHIP OF SOUTH HARRISON.

No sewers.

TOWNSHIP OF WASHINGTON.

No sewers.

TOWNSHIP OF WEST DEPTFORD.

No sswers. No water-supply.

BOROUGH OF WENONAH.

1. Population by the last United States census—473.
2. Estimated population at present time—500.
3. Character of population. Manufacturing, urban or suburban? Suburban.
4. Topographical character. Hilly, undulating or flat? Undulating.
5. Supply of water. By gravity or pumping? Pumping from artesian wells.
6. Estimated consumption of water per diem for each inhabitant —Hard to estimate. In summer the stand-pipe holding 120,000 gallons is emptied daily.
7. Sewerage or none? Yes, Waring system.
8. (*a*) Is sewerage combined, separate or both? Separate.
13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—Estimated, two miles.

(*b*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes.
15. (*a*) Are sewers concentrated into one point of discharge or not? One point.

(*b*) If so, where? Western boundary of borough.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.
18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Intermittent. Difficult to estimate daily discharge.

19. Is there a complete system of inspection, care and maintenance of the sewers? Waring system.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? System is owned by one party.

21. What is the charge for tapping the sewers? Fifty to seventy-five dollars.

22. Number of house connections—Twelve or thirteen.

24. Number of other connections—One hotel.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September. Not so discharged.

W. J. DAWSON, *Mayor.*

Wenonah, N. J., November 25th, 1899.

CITY OF WOODBURY.

No report.

TOWNSHIP OF WOOLWICH.

No sewers.

HUDSON COUNTY.

CITY OF BAYONNE.

1. Population by the last United States census—19,685.

2. Estimated population at the present time—26,000.

3. Character of population. Manufacturing, urban or suburban? Each of the various kinds named, manufacturing being the largest.

4. Topographical character. Hilly, undulating or flat? Undulating and level in large sections (salt marsh).

5. Supply of water. By gravity or pumping? Gravity.

6. Estimated consumption of water per diem for each inhabitant—116 gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Combined in all public sewers; house drainage only in private sewers.

(*b*) If both, how much of each? Amount of private sewerage cannot be stated with accuracy.

10. (*a*) Are the present sewers adequate for storm service? Generally they are, except during excessive rain-falls.

11. (*a*) Number of miles of sewers of combined system—21.

(*b*) Number of silt basins—380.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—$9\frac{5}{10}$, $2\frac{1}{2}$ to $4\frac{1}{2}$ feet in diameter; $\frac{15}{100}$ miles cast-iron, 18 to 48 inches; $11\frac{5}{10}$ miles 12 to 24-inch pipe.

14. Are the sewers kept carefully clean? No.

15. (*a*) Are sewers concentrated into one point of discharge or not? Each separate basin or drainage area empties at one point.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge. Five in Newark Bay, two in New York Bay and two in Kill von Kull.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Territory too sparsely built upon and too varied to estimate upon.

19. Is there a complete system of inspection, care and maintenance of the sewers? No.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? Two dollars.

22. Number of house connections—Cannot state.

BOROUGH OF EAST NEWARK.

Estimated population at present time—3,500. Character of population—manufacturing and urban. Topographical character—undulating. Supply of water by gravity. Estimated consumption of water per diem for each inhabitant—100 gallons.

Sewerage or none? Every street sewered.

Is sewerage combined, separate, or both? Combined.

Are the present sewers adequate for storm service? Yes.

Is provision made for ground-water entering sewers? Yes.

Are sewers kept carefully clean? Yes.

Are sewers concentrated into one point of discharge? Yes.

Where? Foot of Central avenue.

Is there any treatment of sewage before discharge? No.

Do all the sewers flow by gravity? Yes.

Is there a complete system of inspection, care and maintenance of the sewers? Yes.

Statistics of the sewers not reported.

TOWN OF GUTTENBURG.

Estimated population, 2,500. Water supplied by pumping. No sewers.

CITY OF HOBOKEN.

1. Population by the last United States census—43,648.

2. Estimated population at present time—About 65,000.

3. Character of population—Manufacturing and urban.

4. Topographical character—hilly, undulating or flat? Partly upland, partly former tide-marsh.

5. Supply of water—by gravity or pumping? Gravity, from storage reservoir filled by pumping.

6. Estimated consumption of water per diem for each inhabitant—Eighty gallons per head.

7. Sewerage or none? Sewerage is not perfect.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—Nineteen miles paved. Twenty miles unpaved, but not all graded. Annual amount of paving done is very variable.

10. (*a*) Are the present sewers adequate for storm service? Yes.

(*b*) If not, is the enlargement of the sewers under comtemplation? No.

11. (*a*) Number of miles of sewers of combined system—About 14 miles.

(*b*) Number of silt basins—About 500 corner receiving-basins.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—About 14 miles; most of the brick sewers are 2 feet 6 inches by 3 feet 9 inches clear. Pipe sewers mostly 12 inches.

12. If combined system is in use, is provision made for ground-water entering sewers? No.

13. (*b*) Number of manholes, with average distance between manholes—Indefinite; they are about 100 feet apart.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Only by leakage.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Not known.

14. Are the sewers kept carefully clean? They are not.

15. (*a*) Are sewers concentrated into one point of discharge or not? There are several outlets.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Into the Hudson river.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—The discharge is intermittent in the lowland section, as sewers are tidelocked. Total discharge unknown.

19. Is there a complete system of inspection, care and maintenance of the sewers? No.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Plumbers, yes.

21. What is the charge for tapping the sewers? $5.

22. Number of house connections—Each house has sewer connection.

23. Number of factory connections—Not known; all connected, where there are sewers.

24. Number of other connections—Unknown.

25. If not known separately, number of total connections—Unknown.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—Tidewater.

27. If the sewage is subjected to treatment for its purification before final discharge, has the result of purification been satisfactory? No experiments made.

TOWNSHIP OF HARRISON.

1. Population by the last United States census—8,338.

2. Estimated population at present time—12,150.

3. Character of population—manufacturing, urban or suburban? Cosmopolitan, manufacturing.

4. Topographical character—hilly, undulating or flat? Half of the area is mostly flat.

5. Supply of water—by gravity or pumping? Pequannock, by gravity.

6. Estimated cousumption of water per diem for each inhabitant—The total consumption of water per year, 120,964,000 gallons.

7. Sewerage or none—Yes.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—Three miles of paved streets, two miles in five years.

10. (*a*) Are the present sewers adequate for storm service? They are not.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—Four miles.

(*b*) Number of silt basins—125.

(*c*) Miles of brick sewer and miles of pipe sewer with sizes. One mile of 30-inch brick and three miles of 20 and 30-inch pipe.

12. If combined system is in use, is provision made for ground-water entering sewers? Yes.

(*b*) Number of manholes with average distance between manholes. 60 manholes.

(*c*) Are all sewers straight both in line and grade between manholes? Yes.

14. Are the sewers kept carefully clean? No they are not.

15. (*a*) Are sewers concentrated into one point of discharge or not? Three (3) points.

(c) If there are various points of discharge, state how many and into what places do the various outlets discharge? 3 points. Passaic river.

16. (a) Is there any treatment of sewage before discharge? No.

(c) Are there any storage tanks? No.

17. (a) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers. Yes from year 1897.

20. (a) Does the city make its own connections in the streets to the sewers, or do outside parties? Outside parties.

(b) And if so are the latter duly licensed? $1,000 bond.

21. What is the charge for tapping the sewers? $1.00.

22. Number of house connections—700.

24. Number of other connections—30.

CITY OF JERSEY CITY.

1. Population by the last United States census—192,000.

2. Estimated population at present time—210,000.

3. Character of population—Manufacturing, urban or suburban? Urban.

4. Topographical character—hilly, undulating or flat? A central ridge about eighty feet high extends generally north and south, from which slopes east and west to tide water.

5. Supply of water—by gravity or pumping? Both.

6. Estimated consumption of water per diem for each inhabitant—125 gallons.

8. (a) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved, and the annual amount of paving done per year—100 miles paved; 101 miles unpaved; about 8 miles per annum.

10. (a) Are the present sewers adequate for storm service? Yes, with four exceptions; these being Montgomery, Grand and Eighth streets and Fairmount avenue.

(b) If not, is the enlargement of the sewers under contemplation? Yes.

11. (a) Number of miles of combined system—99.5.

(b) Number of silt basins—About 1,300.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—See general remarks.

12. If combined system is in use, is provision made for ground-water entering sewers? Yes.

13. (*b*) Number of manholes, with average distance between manholes—Number unknown; average distance 100 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? As a rule, yes.

(*d*) Does ground-water enter into the sewers? Yes.

14. Are the sewers kept carefully clean? Fairly so.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge? Newark and New York bays, Hackensack and Hudson rivers.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one? Unknown.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? In new sewers, the city; in old, outside parties.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $3 to $12, according to size.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—All discharge into tide-water.

General Remarks.

SEWERS.

Sewers in city—97.4 miles, made up as follows:

	1899.	
12-inch vitrified pipe	18,714.4	lineal feet.
15 " " "	44,016	" "
18 " " "	104,757.5	" "
24 " " "	284	" "

16-inch	iron	pipe	25	lineal	feet.
20 "	"	"	2,042	"	"
24 "	"	"	60	"	"
36 "	"	"	2,157	"	"
48 "	"	"	5,124	"	"
36 "	steel	"	21,179	"	"
42 "	"	"	1,195	"	"
48 "	"	"	6,077	"	"
66 "	"	"	4,600	"	"
18 "	brick	sewer	24,545	"	"
20 "	"	"	1,993	"	"
24 "	"	"	106,281.2	"	"
30 "	"	"	61,202	"	"
36 "	"	"	49,349	"	"
40 "	"	"	1,060	"	"
42 "	"	"	45,475	"	"
48 "	"	"	27,264	"	"
54 "	"	"	12,101	"	"
60 "	"	"	4,995	"	"
4x8 feet	"	"	1,410	"	"
Total			525,916.1	"	"
Total miles			99.5		

TOWN OF KEARNY.

1. Population by the last United States census—10,417.
2. Estimated population at present time—11,000.
3. Character of population. Manufacturing, urban or suburban? Manufacturing and suburban.
4. Topographical character. Hilly, undulating or flat—Hilly.
5. Supply of water—By gravity or pumping? Gravity.
6. Estimated consumption of water per diem for each inhabitant—Twenty-five gallons.
7. Sewerage or none? Sewerage.
8. (*a*) Is sewerage combined, separate, or both? Combined.
9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—70-100 mile paved streets; 57¾ miles unpaved streets. Paving done at intervals of years.

10. (*a*) Are the present sewers adequate for storm service? Yes.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—$21\frac{15}{100}$ miles.

(*b*) Number of silt basins—Approximately, 150.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—2.83 miles of brick sewer from 36 inches to 72 inches, and $18\frac{82}{100}$ miles of pipe sewer, from 10 inches to 30 inches.

12. If combined system is in use, is provision made for ground-water entering sewers? No.

13. (*b*) Number of manholes, with average distance between manholes—Five hundred and thirty. 180 feet apart, average.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Several points.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Five. Three discharge into the Passaic river, on the west side of Town, and two into Frank creek (with mouth at Passaic river), east side of Town.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if one only, and the daily discharge of the various outlets if more than one—300,000 gallons, approximate discharge by the five outlets combined.

19. Is there a complete system of inspection, care and maintenance of the the sewers? Yes.

20. (*a*) Does the city make its own connections in the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? Two dollars.

22. Number of house connections—1,000 (approximate).

23. Number of factory connections—Three.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—Tide-water, 5 to 6 miles per hour.

General Remarks.

The quantity of sewerage discharge given as answer to No. 18 is the computed discharge of sewerage only, and does not include any storm-water. The estimated water consumption is based on total population, but only a part use the water-supply, so the actual consumption is larger.

WILLIAM BARDSLEY,
Chairman Town Council.

TOWNSHIP OF NORTH BERGEN.

1. Population by the last United States census—5,715.
2. Estimated population at present time—About 11,000.
3. Character of population. Manufacturing, urban or suburban? Suburban and manufacturing.
4. Topographical character. Hilly, undulating or flat? Hilly, sloping westward to meadow and marsh land.
5. Supply of water. By gravity or pumping? Gravity.
6. Estimated consumption of water per diem for each inhabitant—Don't know. You might inquire of Hackensack Water Company.
7. Sewerage or none? None.

General Remarks.

In the absence of sewerage system, the inhabitants build cesspools and vaults on their land. In many cases the ordinary waste-water from houses is run into the gutters which find their outlet through old natural water-courses to the Hackensack river. Just at present the Township Committee of North Bergen, in conjunction with the Town Council of the town of West New York, are taking preliminary steps in the matter of building a joint trunk sewer to drain the town of West New York and the northern part of North Bergen westward to one of the creeks which empty into the Hackensack river.

Respectfully,

M. F. MONLAN,
Chairman.

TOWN OF UNION.

No report.

TOWNSHIP OF WEEHAWKEN.

1. Population by the last United States census—Not quite 2,000.

2. Estimated population at present time—Between 5,000 and 6,000.

3. Character of population—Manufacturing. Urban or suburban? Suburban.

4. Topographical character—Hilly, undulating or flat? Hilly.

5. Supply of water—By gravity or pumping? Gravity, from hand pipes.

6. Estimated consumption of water per diem for each inhabitant —Total consumption per diem about 500,000 gallons. This includes water furnished to the West Shore and Erie railroads. It is impossible to give now the consumption per capita.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year —Paved or macadamized, 6.8 miles; 4.4 miles unpaved. None.

10. (*a*) Are the present sewers adequate for storm service? Yes.

11. (*b*) Number of silt basins—Unknown.

(c) Miles of brick sewer and miles of pipe sewer, with sizes—Main sewers, 2.4; laterals, 7.5; includes brick and pipe.

12. If combined system is in use is provision made for ground-water entering sewers. I think not.

14. Are the sewers kept carefully clean? They are mostly self-cleansing.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Five outlets. All discharge into Hudson river.

16. (*a*) Is there any treatment of sewage before discharge? None.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers? No. Cleaned when necessary.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? No.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? No charge.

General Remarks.

Weehawken is situated along the river front and the adjoining bluff, and about 2,500 feet inland from the face of the bluff. The greater portion of the township, prior to 1894, consisted of eight large estates. About that time these tracts were turned over by their respective owners to real estate operators in New York city, who cut them up and sold them in lots. When the streets were opened the agents availed themselves of the excellent drainage facilities at hand and built their own sewers before the lots were sold. As a result none of the data in relation to these sewers is in the possession of the Township Committee, as that body merely accepted the streets and sewers after they had been dedicated to public use. Owing to the fact that of the seven or eight engineers who were engaged on these improvements—several have died or gone out of business—it is impossible to obtain any data bearing on the laterals. Two of the five outlets I mention were built years ago by the towns of West Hoboken, Union, West New York and Weehawken jointly. The third was built by the county; fourth, by private parties, and the fifth by the township itself. This last is the outlet for the system in the southern end of the township, which is a tidal system; but as it comprises only about one-tenth of the total sewerage work; and might therefore be misleading, I will hold the data in relation to it until I finish the new sewer map, at which time I will send your Commission a complete report.

GEORGE W. BOND,
Engineer.

TOWN OF WEST HOBOKEN.

1. Population by the last United States census—10,400.
2. Estimated population at present time—27,000.
3. Character of population—Manufacturing, urban and suburban? Manufacturing and urban.
4. Topographical character—Hilly, undulating or flat? Undulating.
5. Supply of water—By gravity or pumping? Pumped to tower, from there gravity.
6. Estimated consumption of water per diem for each inhabitant—Fifty gallons.

7. Sewerage or none? 452 acres provided with sewers; 94 acres not provided with sewers.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—Five miles paved; thirteen miles not paved—about one-half mile paved each year.

10. (*a*) Are the present sewers adequate for storm service? Not the northern district.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—14 miles.

(*b*) Number of silt basins—250.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—Four miles of brick sewers; sizes, 48 inches down to 20 inches by 30 inches, egg-shaped. Ten miles of pipe sewers; sizes, 20 inches, 18 inches, 15 inches, 12 inches, interior diameter.

12. If combined system is in use, is provision made for groundwater entering sewers? Pipe and brick sewers are not cemented at bottom in some cases.

13. (*b*) Number of manholes, with average distance between manholes—850 manholes; average distance, 100 feet, combined system.

(*c*) Are all sewers straight, both in line and grade, between manholes? Straight.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do they discharge—Northern district into Hudson river; southern district into Penhorn creek, thence into Hackensack river near Newark bay.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

(*a*) Do all sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—Southern joint outlet sewer (without Jersey City), 560,000 gallons; northern joint outlet sewer (without Weehawken), 486,000 gallons; without rainwater.

The rate at which rainwater reaches its outlet is estimated at 176 cubic feet per second, or 1,320 gallons per second for the southern outlet, and 1,050 gallons per second for the northern outlet.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20 (*a*) Does the town make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? None; charge for opening streets for the purpose of tapping sewers.

22. Number of house connections—2,400.

23. Number of factory connections—Ten.

24. Number of other connections—Five watercourses.

GEORGE B. BERGKAMP,
Chairman Town Council.

West Hoboken, New Jersey.

TOWN OF WEST NEW YORK.

Estimated population—8,000. Water supplied by pumping. No sewerage. Sewers are contemplated.

HUNTERDON COUNTY.

TOWNSHIP OF ALEXANDRIA.

No sewers.

TOWNSHIP OF BETHLEHEM.

No sewers.

TOWNSHIP OF CLINTON.

No sewers.

TOWN OF CLINTON.

Estimated population—1,000. Water supplied by gravity. No sewers.

TOWNSHIP OF DELAWARE.

No report.

TOWNSHIP OF EAST AMWELL.

No report.

TOWNSHIP OF FRANKLIN.

No sewers.

BOROUGH OF FRENCHTOWN.

No sewers. No water-supply.

BOROUGH OF HIGH BRIDGE.

No sewers.

TOWNSHIP OF HOLLAND.

No sewers.

BOROUGH OF JUNCTION.

No sewers.

TOWNSHIP OF KINGWOOD.

No sewers.

CITY OF LAMBERTVILLE.

Estimated population—5,200; manufacturing and urban. Water supplied by gravity. No sewers except a small drain for surface-water. Plans for sewers are considered.

TOWNSHIP OF LEBANON.

Estimated population—3,000. No water-supply. No sewers.

TOWNSHIP OF RARITAN.

No report except as to village of Flemington.

1. Population by the last United States census—2,081.
2. Estimated population at present time—2,250.

3. Character of population—Manufacturing, urban or suburban? Urban.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Both.

6. Estimated consumption of water per diem, for each inhabitant—100 gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—No streets paved. Eight and one-half miles of streets.

10. (*a*) Are the present sewers adequate for storm service? No surface-water in.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*c*) Miles of brick sewer and miles of pipe sewer, with sizes—All pipe sewers. 27,188 feet of pipe—2,458 fifteen-inch sewer pipe; 2,043 twelve-inch sewer pipe; 5,993 ten-inch sewer pipe; 16,694 eight-inch sewer pipe.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—Have about 3,000 feet surface-water pipe, owned by private parties.

(*b*) Number of manholes, with average distance between manholes—Forty-one manholes; 650 feet, average distance.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Twenty per cent.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes.

(*b*) If so, where? On a disposal field of five and one-half acres.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? One, 40 feet square, 4 feet deep.

17. (*a*) Do all the sewers flow by gravity? Gravity.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—One outlet; discharge, about 10,000 gallons daily.

19. Is there a complete system of inspection, care and maintenance of the sewers? Daily inspection.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties. Inspected by Superintendent of Sewers.

22. Number of house connections—163.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—On disposal field; six feet of earth filtration.

27. If the sewage is subjected to treatment for its purification before final discharge, has the result of purification been satisfactory? It is satisfactory, and we think almost perfect.

General Remarks.

Our surface and roof water is fairly taken care of by the use of natural streams and pipes put down by private individuals combining to care for water; about one-half of the houses and public stores are in the sewer on the line of it. When parties who are not on the line of the sewers ask for more sewers they will be built. There are 403 buildings in the village. Our sewers have been in operation eight months.

JOHN H. SHROPE,
Superintendent of Sewers.

TOWNSHIP OF READINGTON.

No sewers.

BOROUGH OF STOCKTON.

No sewers excepting two short drains for surface-water.

TOWNSHIP OF TEWKSBURY.

No sewers.

TOWNSHIP OF UNION.

No sewers.

TOWNSHIP OF WEST AMWELL.

No sewers.

MERCER COUNTY.

TOWNSHIP OF EAST WINDSOR.

No sewers.

TOWNSHIP OF EWING.

No report.

TOWNSHIP OF HAMILTON.

No report.

BOROUGH OF HIGHTSTOWN.

No report.

TOWNSHIP OF HOPEWELL.

No sewers.

BOROUGH OF HOPEWELL.

Water supplied by pumping. No sewers.

TOWNSHIP OF LAWRENCE.

No sewers, except small private sewer at Lawrenceville School.

BOROUGH OF PENNINGTON.

No sewers, except between one and two miles of drain-pipe six and eight inches, and some twelve in size, used only for surface-water and cellar drainage, emptying at three points of discharge.

TOWNSHIP OF PRINCETON.

No sewers.

BOROUGH OF PRINCETON.

1. Population by the last United States census—3,422.

2. Estimated population at present time—3,750 (5,000 if students included).

3. Character of population—Manufacturing, urban or suburban? Intelligent, university town population.

4. Topographical character—Hilly, undulating or flat? Hilly.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant—30 gallons for each of about 2,500 consumers.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Strictly plumbing sewerage, nothing being admitted to sewers excepting what is passed through plumbing of buildings; does not drain streets, etc., even rainwater leaders are not connected with it.

10. (*a*) Are the present sewers adequate for storm service? No.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*c*) Miles of pipe sewer, with sizes—About 6 miles; 8-inch.

(*b*) Number of manholes, with average distance between manholes—91; 350 feet. Also, 9 flush-tanks, at heads; also, 5 lampholes.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes, in line, also in grade, as a rule.

(*d*) Does ground-water enter into the sewers? Only by leakage.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Not readily determinable; not serious.

14. Are the sewers kept carefully clean? Yes, by flushing.

15. (*a*) Are sewers concentrated into one point of discharge or not? They are not.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Two points; one, a field two miles northeast by east, and the other a field one mile southeast of borough, both in Princeton township.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? None.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Possibly, northeast by east, 25,000; southeast, 35,000.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outsiders.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? Nothing.

25. If not known separately, number of total connections—About 250.

General Remarks.

What is called French system sewer, on thoroughly underdrained fields, depending on sunlight, air, soakage and vegetation for salvation, system proves successful.

Have had only one complete stoppage, which was quite easily and inexpensively removed. Partial stoppages have been exceedingly rare.

Allow only strictly plumbing connections to prevent drowning at fields.

E. MULFORD UPDIKE,
Mayor.

A. G. MACDONALD,
Inspector.

Princeton, December 27th, 1899.

CITY OF TRENTON.

1. Population by the last United States census—57,458.

2. Estimated population at present time—66,000.

3. Character of population—Manufacturing, urban or suburban? All.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant—107 gallons. (This includes water used for manufacturing purposes.)

7. Sewerage or none? About one-third of the streets are sewered.

8. (*a*) Is sewerage combined, separate or both? Both.

(*b*) If both, how much of each? (See below.)

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—Eighteen miles paved; 80 miles unpaved. We pave about two miles per year.

10. (*a*) Are the present sewers adequate for storm service? The storm sewers are adequate for storm service.

(*b*) If not, is the enlargement of the sewers under contemplation? It is not contemplated.

11. (*a*) Number of miles of sewers of combined system—About 9¾ miles.

(*b*) Number of silt-basins—350.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes? Eleven miles brick; 21 miles pipe; various sizes of both.

12. If combined system is in use, is provision made for ground-water entering sewers? No.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—Twenty-two and seven-tenths miles, of which 21 miles are pipe.

(*b*) Number of manholes, with average distance between manholes—650 manholes; average distance apart, 250 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? All pipe sewers are; large brick sewers have some curves.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Are supposed to be self-cleaning, but deposits are removed if they occur.

15. (*a*) Are sewers concentrated into one point of discharge or not? Sewage is discharged at one point.

(*b*) If so, where? Main channel Delaware river, below city limits.

(*c*) If there are various points of discharge state how many and into what places do the various outlets discharge—There are three storm-water overflows into Assanpink creek, and three into Delaware river.

16. (*a*) Is there any treatment of sewage before discharge? There is not.

(*c*) Are there any storage tanks? There are not.

17. (*a*) Do all the sewers flow by gravity? They do.

18. State daily discharge of one outlet if only one, and the daily discharge of the various outlets if more than one—Discharge is not known, no measurement having been taken.

19. Is there a complete system of inspection, care and maintenance of the sewers? Sewers are inspected, but not as carefully as if a larger appropriation were available.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Plumbers make connection under supervision of an inspector.

21. What is the charge for tapping the sewers? Fee paid inspector on filing plan is $2.

22. Number of house connections—No data available.

25. If not known separately, number of total connections—Estimated, 14,000.

General Remarks.

In addition to the sewers (as above given) there are six and two-tenths (6 $^{2}/_{10}$) miles of drains, used exclusively for storm-water drainage from streets, and in some cases for the drainage of subsoil-water from cellars. These drains range in size from 8-inch to 24-inch pipe, and from 2-foot by 3-foot to 4-foot by 5-foot oval brick drains.

TOWNSHIP OF WASHINGTON.

No sewers.

TOWNSHIP OF WEST WINDSOR.

No report.

MIDDLESEX COUNTY.

TOWNSHIP OF CRANBURY.

No sewers. No water-supply.

BOROUGH OF DUNELLEN.

No sewers.

TOWNSHIP OF EAST BRUNSWICK.

No sewers.

BOROUGH OF HELMETTA.

Estimated population, 600. Water supplied by pumping. One surface-drainage pipe sewer, draining main street and emptying into Manalapan river, and one combined sewer, less than a mile in length, having four factory connections and draining surface-water, emptying into Manalapan river.

BOROUGH OF JAMESBURG.

No sewers. No water-supply.

TOWNSHIP OF MADISON.

No sewers. No water-supply.

BOROUGH OF MILLTOWN.

No report.

TOWNSHIP OF MONROE.

No report.

CITY OF NEW BRUNSWICK.

2. Estimated population at present time—20,000.

3. Character of population. Manufacturing, urban or suburban? Manufacturing.

4. Topographical character. Hilly, undulating or flat? Undulating.

5. Supply of water. By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant—Sixty gallons per capita, or including manufacturing, eighty gallons.

7. Sewerage or none? Partially sewered.

8. (*a*) Is sewerage combined, separate or both? Both.

(*b*) If both, how much of each? $5\frac{17}{100}$ miles combined; $3\frac{44}{100}$ miles separate sewers built by city.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year —11 miles paved; 40 miles unpaved.

10. (*a*) Are the present sewers adequate for storm service? Will carry off two inches per hour.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—$5\frac{17}{100}$.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—$4\frac{22}{100}$ pipe, 12 inches to 18 inches; $\frac{95}{100}$ brick, 30 inches to 60 inches.

12. If combined system is in use, is provision made for ground-water entering sewers? No. Very little ground-water here.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—$3\frac{44}{100}$, 8 inches to 24 inches.

(*b*) Number of manholes, with average distance between manholes—Manholes average 200 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter the sewers? No.

14. Are the sewers kept carefully clean? No.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—Two at present. Into Raritan river, above and below town.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Don't know.

19. Is there a complete system of inspection, care and maintenance of the sewers? No.

20. (*a*) Does the city make its own connections in the street to the sewers or do outside parties? Outsiders.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? No charge.

22. Number of house connections—Every $16\frac{1}{2}$ feet on combined system; every 25 feet on separate.

23. Number of factory connections—Thirty.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—See New Jersey State Report on Stream Flows for Raritan River.

General Remarks.

Besides the city separate sewer there are about three miles of private sewers connected with them. We have three miles of separate sewers under contract which will be completed by December 15th, 1899. The cost of separate sewers here has averaged $1.47 per foot for the $3\frac{44}{100}$ miles constructed. Those under contract now will cost less than $1.00 per foot. The combined system was built about 1870, by some politicians, and cost $13 per foot. The city is still paying interest on that work, while the separate sewers are all paid for as they are built. In two years we will have all the built-up portions of the town provided with sewers.

ASHER ATKINSON,
Engineer.

TOWNSHIP OF NORTH BRUNSWICK.

No sewers.

CITY OF PERTH AMBOY.

1. Population by the last United States census—13,030.

2. Estimated population at present time—15,000.

3. Character of population—Manufacturing, urban or suburban? Manufacturing.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant, 145 gallons. Average daily supply, 2,173,000 gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—With the exception of 220 feet of vitrified brick pavement at the foot of Smith street, there are no paved streets.

10. (*a*) Are the present sewers adequate for storm service? Except during very heavy showers.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—Ten miles.

(*b*) Number of silt-basins—247 receiving-basins.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes—3-foot 6-inch by 4-foot 6-inch, 5,158; 2-foot 4-inch by 3-foot 6-inch, 5,420; 2-foot by 3-foot, 14,861; 1-foot 8-inch by 2-foot 4-inch, 260; 24-inch pipe, 1,000; 18-inch, 5,340; 15-inch, 2,578; 12-inch, 17,690; 10-inch, 700; 8-inch, 300.

12. If combined system is used, is provision made for ground-water entering sewers? No provision has been found to be necessary, it gets in anyway.

13. (*b*) Number of manholes, with average distance between manholes—About 300, about 175 feet apart. On pipe lines they have generally been put from 100 to 150 feet apart; on brick sewers, at greater distances.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? We have no means of telling.

14. Are the sewers kept carefully clean? They generally keep themselves clean; never cleaned but one.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

c If there are various points of discharge, state how many and into what places do the various outlets discharge—Four into the Raritan river, seven into Staten Island sound.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily dischage of the various outlets if more than one—No attempt has ever been made to gauge them.

19. Is there a complete system of inspection, care and maintenance of the sewers? No.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter licensed? Yes, they must get permission and give $100 bond each time.

21. What is the charge for tapping the sewers? No charge.

22. Number of house connections—Impossible to tell.

23. Number of factory connections—Impossible to tell.

24. Number of other connections—Impossible to tell.

General Remarks.

Accompanying this report I send you a map of the laid-out portion of the city, showing the several sewer systems with their sizes, and arrows indicating the direction of flow. The above statistics refer only to the public sewers. A few of the private sewers are shown, more to show why no public sewers are located in those streets than for any other purpose. New Brunswick avenue and the Woodbridge road on the old roads leading out of town, with the exception of Market street, all the streets west of State street have been projected and opened in recent years and all improvements made on them have been made within the last ten years. The first sewer laid in Perth Amboy was the one in Smith street, from State street to the sound; this was laid in 1859. No more were laid until 1877, when the Jefferson street sewer was laid. This was followed about two years later by the Fayette street sewer from New Brunswick avenue to the sound. The Rector street sewer was laid in 1880 and the Washington street sewer from East avenue to the sound followed in 1883, and the Commerce street sewer in 1886. All the rest have been laid since; sewers have been petitioned for and will doubtless be built in Brighton avenue, Broad street, New Brunswick avenue west of the L. V. R. R. to Stanford street, and on Elizabeth street.

Perth Amboy presents no difficulties to good sewerage. Like most towns it has been laid out piece by piece, as the owners of the property chose, and streets projected to suit the ideas of individual owners rather than with regard to conforming to any general plan—and while the sewers are laid pursuant to the petition of property owners and without regard to any general plan, yet the idea has always been kept in

mind to look out for possible extensions and to plan ahead as well as we could under the circumstances. Some time in the future a large sewer will have to be built to provide for the territory at the north end, as shown on the map, and this will be an expensive work. But for the most part the combined system has about reached its limit and extensions hereafter made will probably be on the separate or restricted system.

Respectfully submitted,

C. C. HANMANN,

City Surveyor.

August 24th, 1899.

TOWNSHIP OF PISCATAWAY.

No water-supply. No sewers, except at Lincoln. The Lincoln sewer has about a mile of separate pipe sewer, with about 20 connections, emptying into Green brook at one point of discharge. Population of Lincoln is about 150; of the whole township about 2,500.

TOWNSHIP OF RARITAN.

No public sewers.

TOWNSHIP OF SAYREVILLE.

No sewers. No water-supply.

BOROUGH OF SOUTH AMBOY.

Water-supply and sewer system. Details not reported. Extension of sewer system contemplated.

TOWNSHIP OF SOUTH BRUNSWICK.

No report.

BOROUGH OF SOUTH RIVER.

No report.

CITY OF WOODBRIDGE.

No report.

MONMOUTH COUNTY.

BOROUGH OF ALLENHURST.

2. Estimated population at present time—2,000 in summer; 200 in winter.

3. Character of population—Manufacturing, urban or suburban? Suburban.

4. Topographical character—Hilly, undulating or flat? Flat.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant—150 gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? House system only.

10. (*a*) Are the present sewers adequate for storm service? No surface-water enters.

11. (*b*) Number of silt-basins—One.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes. All pipe sewers.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—4,250 feet 12-inch pipe sewer; 1,100 feet 10-inch pipe sewer; 3,800 feet 8-inch pipe sewer; 5,400 feet 6-inch pipe sewer.

(*b*) Number of manholes, with average distance between manholes—Thirty-two average distance apart, 475 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes.

(*b*) If so, where? Atlantic ocean.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? The borough makes connections.

21. What is the charge for tapping the sewers? $5.
22. Number of house connections—143.

BOROUGH OF ALLENTOWN.

No sewers.

CITY OF ASBURY PARK.

Water-supply and sewer system. Details not reported.

TOWNSHIP OF ATLANTIC.

No sewers.

BOROUGH OF ATLANTIC HIGHLANDS.

No report.

BOROUGH OF BELMAR.

2. Estimated population at present time—800 winter; 5,000 to 8,000 summer.

3. Character of population—Manufacturing, urban or suburban? Suburban.

. Topographical character—Hilly, underlating or flat? Flat, with gentle ascent from the ocean beach westward.

5. Supply of water—By gravity or pumping? Pumping.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes? About 8½ miles—20, 18, 15, 12, 10 and 8-inch pipe sewers.

(*b*) Number of manholes, with average distance between manholes? Eighty-nine manholes; 64 inspection holes; 250 feet between openings.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

e) If so, what proportion of ground-water to sewage flows into the pipes? A very small proportion; not ascertained exactly.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? There are two points of discharge into Atlantic ocean, at 5th and 8th avenues.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Amount varies; not exactly ascertained.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $5.

22. Number of house connections—about 300.

General Remarks.

Systems discharge into Atlantic ocean through submerged outlets. The northern portion discharges at Fifth avenue through an 8-inch wrought-iron pipe with flexible joints and uptured end in the ocean. Length of ocean outlet is 420 feet.

The southern portion of the system discharges at Eighth avenue through a 6 inch wrought-iron pipe with an 8 inch wrought-iron pipe for emergency use. Length of 6-inch outlet is about 800 feet. Length of 8-inch outlet is about 300 feet.

BOROUGH OF BRADLEY BEACH.

No sewers.

TOWNSHIP OF EATONTOWN.

No sewers. No water-supply.

BOROUGH OF ENGLISHTOWN.

No sewers. No water-supply.

TOWNSHIP OF FREEHOLD.

No sewers.

TOWN OF FREEHOLD.

1. Population by the last United States census—2,932.

2. Estimated population at present time—3,300.

3. Character of population—Manufacturing, urban or suburban? Urban.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant. Fifty-four gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—20,832 feet, 6-inch; 9,602, 8-inch; 2,227, 10-inch; 1,269, 12-inch; 1,202, 15 inch. Total, 34,132 feet.

(*b*) Number of manholes, with average distance between manholes—33. 1,000 feet apart.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Twenty-five per cent. in the spring, at other times not noticeable.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? One point.

(*b*) If so, where? At sewage-disposal field.

16. (*a*) Is there any treatment of sewage before discharge? No, except by disposal-field.

(*c*) Are there any storage-tanks? One receiving-tank.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet if only one, and the daily discharge of the various outlets if more than one—100,000 gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? By outside parties.

(*b*) And if so are the latter duly licensed? Yes, by Board of Health.

21. What is the charge for tapping the sewers? $2.

25. If not known separately, number of total connections—280.

27. If the sewage is subjected to treatment for its purification before final discharge, has the result of purification been satisfactory? Yes, entirely so.

General Remarks.

Our sewage is disposed of on a field prepared according to plans and under the supervision of the late Col. George E. Waring, Jr. I mail you to-day a full report of the construction of the same.

TOWNSHIP OF HOLMDEL.

No sewers. No water-supply.

TOWNSHIP OF HOWELL.

No sewers.

BOROUGH OF LONG BRANCH.

Sewer system controlled by Long Branch Sewer Company. Details not reported.

TOWNSHIP OF MANALAPAN.

No sewers.

BOROUGH OF MANASQUAN.

No sewers.

TOWNSHIP OF MARLBORO.

No sewers.

TOWNSHIP OF MATAWAN.

No sewers.

BOROUGH OF MATAWAN.

No report.

TOWNSHIP OF MIDDLETOWN.

No sewers.

TOWNSHIP OF MILLSTONE.

No sewers.

TOWNSHIP OF NEPTUNE.

No sewers.

BOROUGH OF NEPTUNE CITY.

No report.

BOROUGH OF NORTH SPRING LAKE.

Estimated population, 300 in winter, 1,500 in summer. Water supplied by pumping. Two separate sewers, consisting of 8, 10 and 12-inch pipe, emptying at two points into the Atlantic ocean, one having a storage tank at Ocean avenue.

TOWNSHIP OF OCEAN.

No sewers.

TOWNSHIP OF RARITAN.

No report.

TOWN OF RED BANK.

2. Estimated population at present time—About 6,000.
3. Character of population—Manufacturing, urban or suburban? Urban.
4. Topographical character—Hilly, undulating or flat? Undulating.
5. Supply of water—By gravity or pumping? By pumping from pipe wells.
6. Estimated consumption of water per diem for each inhabitant—About 400 families take water.
7. Sewerage or none? Sewerage.
8. (*a*) Is sewerage combined, separate or both? Separate.
9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—No paving.

11. (*a*) Number of miles of sewers—About eight.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—From 8-inch to 15-inch pipe.

(*b*) Number of manholes, with average distance between manholes—About 300 feet between manholes.

(*c*) Are all sewers straight both in line and grade between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? About four to one of sewage.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes, concentrated at one point.

(*b*) If so, where? In river.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—About 500,000 gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? No, cared for by street superintendent.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? No charge.

22. Number of house connections—About 150.

23. Number of factory connections—None.

24. Number of other connections—Ten hotel.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—Tide-water; several fresh-water streams empty near Red Bank.

General Remarks.

The sewers have not been in use over six months. Very few have connected.

Very truly yours,

O. E. Davis.

BOROUGH OF SEABRIGHT.

2. Estimated population at present time—3,000.

3. Character of population—Manufacturing, urban or suburban? Seaside resort.

4. Topographical character—Hilly, undulating or flat. Flat.

5. Supply of water—By gravity or pumping. Pumping.

7. Sewerage or none? Yes.

8. (*a*) Is sewerage combined, separate, or both. Separate.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—No paved streets.

10. (*a*) Are the present sewers adequate for storm service? Yes.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*b*) Number of silt-basins—15.

12. If combined system is in use, is provision made for ground-water entering sewers? Yes.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—Three miles (6 and 8-inch pipe).

(*c*) Are all sewers straight both in line and grade between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Rain-water.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge? Shrewsbury river.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one? Cannot say.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? No charge.

22. Number of house connections—About 150.

23. Number of factory connections—None.

24. Number of other connections—None.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—Shrewsbury river, about 5 to 6 miles per hour.

General Remarks.

Borough government put in sewers with privilege to residents to make their own taps.

P. HALL PACKER,
Mayor.

TOWNSHIP OF SHREWSBURY.

No public sewers. One private sewer on Rumson road near Seabright. Details not reported.

BOROUGH OF SPRING LAKE.

1. Population by the last United States census—80.

2. Estimated population at present time—300.

3. Character of population—Manufacturing, urban or suburban? Urban.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Pumping.

6. Estimated consumption of water per diem for each inhabitant. Twenty gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Separate.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year. Unpaved.

10. (*a*) Are the present sewers adequate for storm service? Yes.

11. (*b*) Number of silt-basins—2.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—4 miles. 6, 8, 10, 12, 15, 18-inch pipes.

(*b*) Number of manholes with average distance between manholes—15.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes.

(*b*) If so, where? Atlantic ocean, 680 feet to sea.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage tanks? No.

17. Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? City.

(*b*) And, if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $10.

22. Number of house connections—127.

23. Number of factory connections—One.

24. Number of other connections—One.

25. If not known separately, number of total connections—129.

General Remarks.

Spring Lake is a summer or seashore resort, and summer population is about 5,000, while winter is about 300. We have a new and complete sewer and water system, owned and controlled by the borough, water from artesian wells and sewerage emptied 680 feet in the ocean, where it is never heard from and comparatively inexpensive.

E. V. PATTERSON, *Mayor.*

TOWNSHIP OF UPPER FREEHOLD.

No sewers.

TOWNSHIP OF WALL.

No sewers.

MORRIS COUNTY.

TOWNSHIP OF BOONTON.

No sewers. No water-supply.

TOWNSHIP OF CHATHAM.

No sewers. No water-supply.

BOROUGH OF CHATHAM.

Estimated population—1,500, of suburban and agricultural character. No sewers. Water supplied from driven wells. Total supply, 12,867,769 gallons up to December 29. Average, 1,072,314 per month. 123 water taps, 104,116 gallons per tap per year; on basis of population, $17\frac{11}{365}$ gallons a day per capita. Seven greenhouses with 3,500,000 consumption. Larger part of water supplied from wells.

TOWNSHIP OF CHESTER.

No sewers. No water-supply.

TOWN OF DOVER.

Estimated population, 6,000. Water supplied by gravity. No sewers.

TOWNSHIP OF HANOVER.

No sewers.

TOWNSHIP OF JEFFERSON.

No report.

BOROUGH OF MADISON.

Estimated population, 4,000. No sewers. Water supplied by pumping.

TOWNSHIP OF MENDHAM.

No sewers.

TOWNSHIP OF MONTVILLE.

No sewers. No water-supply.

TOWNSHIP OF MORRIS.

No sewers.

TOWN OF MORRISTOWN.

No sewers.

BOROUGH OF MOUNT ARLINGTON.

No sewers. Estimated population in winter, 300; in summer, 3,000. Water supplied by pumping—from Lake Hopatcong.

TOWNSHIP OF MOUNT OLIVE.

No sewers.

BOROUGH OF NETCONG.

No sewers. No water-supply.

TOWNSHIP OF PASSAIC.

No report.

TOWNSHIP OF PEQUANNOCK.

No sewers.

BOROUGH OF PORT ORAM.

Estimated population—2,000. Water supply contemplated. No sewers.

TOWNSHIP OF RANDOLPH.

No report.

TOWNSHIP OF ROCKAWAY.

Estimated population—2,500. No sewers. No water-supply.

BOROUGH OF ROCKAWAY.

Water supplied by gravity. No sewers.

TOWNSHIP OF ROXBURY.

No sewers. No water-supply.

TOWNSHIP OF WASHINGTON.

No sewers.

OCEAN COUNTY.

BOROUGH OF BAYHEAD.

Estimated population, 1,500 in summer, 250 in winter. Water supplied by pumping from artesian wells. Estimated consumption per diem for each inhabitant, 40 gallons. No sewers.

BOROUGH OF BEACH HAVEN.

Seaside resort. Estimated population, 230. Water supplied by pumping. 13,000 feet of 10 and 12-inch pipe; separate sewer, having about 70 house and 4 hotel connections, discharging at two points into Little Egg Harbor bay without treatment.

TOWNSHIP OF BERKELEY.

No sewers.

TOWNSHIP OF BRICK.

Estimated population, 3,000. No sewers.

TOWNSHIP OF DOVER.

No sewers.

TOWNSHIP OF EAGLESWOOD.

Estimated population, 500. No water-supply. No sewers.

TOWNSHIP OF HARVEY CEDARS.

Estimated population, 25. No water-supply. No sewers.

TOWNSHIP OF ISLAND HEIGHTS.

No report.

TOWNSHIP OF JACKSON.

No report.

TOWNSHIP OF LACY.

No water-supply. No sewers.

TOWNSHIP OF LAKEWOOD.

No report.

BOROUGH OF LAVALLETTE.

No sewers.

TOWNSHIP OF LITTLE EGG HARBOR.

No report.

BOROUGH OF SURF CITY.

No sewers.

TOWNSHIP OF MANCHESTER.

Estimated population, 750. No sewers.

TOWNSHIP OF OCEAN.

No sewers.

BOROUGH OF POINT PLEASANT.

No sewers.

TOWNSHIP OF PLUMSTEAD.

No sewers.

BOROUGH OF SEASIDE PARK.

Three private terra-cotta pipe sewers, each 1,500 feet long, controlled by Seaside Park Land Company.

TOWNSHIP OF STAFFORD.

No sewers.

TOWNSHIP OF UNION.

No sewers.

PASSAIC COUNTY.

TOWNSHIP OF ACQUACKANONK.

No sewers.

BOROUGH OF HAWTHORNE.

No sewers.

TOWNSHIP OF LITTLE FALLS.

No report.

TOWNSHIP OF MANCHESTER.

No public sewers.

CITY OF PASSAIC.

2. Estimated population at present time—22,500.

3. Character of population—Manufacturing, urban or suburban? Manufacturing.

4. Topographical character—Hilly, undulating or flat? Westerly half of city hilly; easterly half flat.

5. Supply of water—By gravity or pumping? By pumping.

6. Estimated consumption of water per diem for each inhabitant—Forty-five gallons.

7. Sewerage or none? Sewerage.

8. (*a*) Is sewerage combined, separate or both? Largely separate.

(*b*) If both, how much of each? 28.42 miles of separate and one-fourth of a mile combined. 2.24 miles purely storm-water.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year. Permanent paving (cobblestone) half a mile. Macadam pavement about 24 miles.

10. (*a*) Are the present sewers adequate for storm service? No.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system—One-quarter of a mile.

(*b*) Number of silt-basins—83.

(*c*) Miles of brick sewer and miles of pipe sewer with sizes:

Storm-water sewers—

3′3″x 4′10½″	Egg-shaped brick	3,334.8	lineal feet.
2′8″x 4′	" "	1,285	"
2′2″x 2′10″	" cement	144	"
20″ diameter, vitrified pipe		517	"
24″ "	"	1,600	"
30″ "	"	4,166	"
18″ "	"	452	"
15″ "	"	60	"
12″ "	"	276	"

A total of 2.24 miles.

Sanitary sewers—

Pipe	6″	diameter.....	4,024	lineal feet.	
"	8″	"	120,812	"	
"	10″	"	 9,952	"	
"	12″	"	 3,767	"	
"	15″	"	 6,135	"	(Vitrified pipe).
"	18″	"	 4,025	"	
"	20″	"	 703	"	
"	24″	"	 672	"	
"	30″	"	 936	"	(Cast-iron pipe.)

A total of 28.42 miles.

(*b*) Number of manholes, with average distance between manholes—253. Average distance apart—200 feet.

(*c*) Are all sewers straight, both in line and grade, between manholes? Generally straight.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Estimated about five per cent.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge? No.

(*c*) If there are various points of discharge, state how many and into what places do the various outlets discharge—There are nine (9) outlets—one foot Mercer street, one foot Lodi street, one foot Passaic street, one foot Park place, one foot Essex street, one foot Washington place, one foot Lafayette avenue, one foot Aycrigg avenue, one foot Van Houten avenue.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets if more than one—Total discharge is estimated to be about 1,000,000 gallons per 24 hours.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? The work of making connections is done by plumbers.

(*b*) And, if so, are the latter duly licensed? Supposed to be.

21. What is the charge for tapping the sewers? $5 for each dwelling.

22. Number of house connections—1,720 to date (September 25th, 1899).

23. Number of factory connections—Six.

25. Number of total connections—1,726.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—The sewage is discharged into the Passaic river; the average flow for the months of July, August and September is not known.

CITY OF PATERSON.

1. Population by the last United States census (1890)—78,347.

2. Estimated population at present time—110,000.

3. Character of population—Manufacturing, urban or suburban? Manufacturing and urban.

4. Topographical character—Hilly, undulating or flat? Hilly, and undulating.

5. Supply of water—By gravity or pumping? Pumping to reservoirs; gravity from reservoirs.

6. Estimated consumption of water per diem for each inhabitant—150 gallons.

7. Sewerage or none—Sewerage.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—Paved streets, about fifty-four miles; unpaved streets, about 154 miles; average amount of paving, three miles per year.

10. (*a*) Are the present sewers adequate for storm service? Yes.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*a*) Number of miles of sewers of combined system? $71\frac{72}{100}$ miles.

(*b*) Number of silt-basins? About 1,500.

(*c*) Miles of brick sewer and miles of pipe sewer, with sizes. $20\frac{45}{100}$ miles of brick, 24 inches to 96 inches. $51\frac{27}{100}$ miles of pipe, 12 inches to 30 inches.

12. If combined system is in use, is provision made for ground-water entering sewers? No.

13. If separate system is in use—Not in use.

(*b*) Number of manholes, with average distance between manholes—About 3,500. Average 100 feet between.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes, except where change of grade occurs between manholes.

(*d*) Does ground-water enter into the sewers? No.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*c*) If there are various points of discharge state how many and into what places do the various outlets discharge? Twenty-two points of discharge, all into the Passaic river.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—About 17,000,000 gallons per diem.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Connections are made by licensed plumbers, under inspection by Board of Health.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $4 for each connection.

22. Number of house connections—About 8,000.

23. Number of factory connections—About 500.

25. Number of total connections—About 8,500.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—About 200,000,000 gallons per diem. The minimum flow is about 100,000,000 per diem.

General Remarks.

To the stated sewage flow of 17,000,000 gallons per diem, should be added about 7,000,000 gallons discharged directly into the river from factories.

TOWNSHIP OF POMPTON.

No sewers.

BOROUGH OF POMPTON LAKES.

Estimated population, 900. No sewers. No water-supply.

BOROUGH OF TOTOWA.

No sewers.

TOWNSHIP OF WAYNE.

No sewers.

TOWNSHIP OF WEST MILFORD.

Estimated population—2,346. No water-supply. No sewers.

SALEM COUNTY.

TOWNSHIP OF ALLOWAY.

Estimated population—2,000. No water-supply. No sewers, excepting one of terra-cotta pipe emptying refuse from a creamery into a small pond, and an open ditch emptying refuse from an abattoir into the same pond. These constitute a nuisance.

BOROUGH OF ELMER.

No report.

TOWNSHIP OF ELSINBORO.

No report.

TOWNSHIP OF LOWER ALLOWAYS CREEK.

No report.

TOWNSHIP OF LOWER PENNS NECK.

No report.

TOWNSHIP OF MANNINGTON.

Estimated population—1,900. No sewers.

TOWNSHIP OF OLDMANS.

No sewers.

BOROUGH OF PENNSGROVE.

No report.

TOWNSHIP OF PILESGROVE.

Estimated population—1,800. No water supply. No sewers.

TOWNSHIP OF PITTSGROVE.

Estimated population—2,350. No sewers.

TOWNSHIP OF QUINTON.

Estimated population—1,900. No sewers.

CITY OF SALEM.

Two eight-inch terra cotta sewers on main streets—together, about one and a half miles in length, for house sewerage only.

TOWNSHIP OF UPPER PENNS NECK.

No sewers.

TOWNSHIP OF UPPER PITTSGROVE.

Population by last United States census—1,923. Estimated population—1,800. Suburban population. No sewers.

BOROUGH OF WOODSTOWN.

No public sewers.

SOMERSET COUNTY.

TOWNSHIP OF BEDMINSTER.

Estimated population—2,000. No sewers.

TOWNSHIP OF BERNARDS.

Estimated population—2,800. No sewers, excepting 500 feet of ten-inch street drain at Bernardsville, emptying into Mine brook.

BOROUGH OF BOUND BROOK.

Estimated population—2,500. Water supplied by gravity. Estimated consumption of water per diem for each inhabitant—30 gallons. Six miles of 8, 10, 12 and 24-inch separate sewer, having 150 house connections and one factory connection, emptying at one point of discharge into Raritan river.

TOWNSHIP OF BRIDGEWATER.

No sewers.

TOWNSHIP OF BRANCHBURG.

No sewers.

TOWNSHIP OF FRANKLIN.

No sewers.

TOWNSHIP OF HILLSBORO.

No sewers.

BOROUGH OF MILLSTONE.

Estimated population—250. No sewers.

TOWNSHIP OF MONTGOMERY.

Estimated population, 1,644. No water-supply. No sewers.

TOWNSHIP OF NORTH PLAINFIELD.

No sewers.

BOROUGH OF NORTH PLAINFIELD.

Estimated population, 5,000. No sewers.

TOWNSHIP OF RARITAN.

Estimated population, 3,000. Water supplied by pumping. Sewers discharging without treatment at two points into Raritan river. Details of sewers not reported.

BOROUGH OF ROCKY HILL.

Estimated population, 300. No water-supply. No sewers, excepting a few small drains.

TOWN OF SOMERVILLE.

Estimated population, 5,000. Water supplied by pumping. Estimated consumption of water per diem for each inhabitant, 90 gallons. About six miles of pipe sewer, four miles being 8 inch pipe and two miles of 24, 18, 12, 10 and 9-inch pipe, discharging at two points into Raritan river.

TOWNSHIP OF WARREN.

No sewers.

SUSSEX COUNTY.

TOWNSHIP OF ANDOVER.

Estimated population, 1,500. No sewers.

TOWNSHIP OF BYRAM.

No sewers. No water-supply.

BOROUGH OF BRANCHVILLE.

No report.

BOROUGH OF BROOKLYN.

No sewers. No water-supply. Summer resort.

BOROUGH OF DECKERTOWN.

Estimated population, 1,200. No sewers. Water supplied by gravity. Estimated consumption per diem for each inhabitant, 60 gallons.

TOWNSHIP OF FRANKFORD.

No sewers.

TOWNSHIP OF GREEN.

No sewers. No water-supply.

TOWNSHIP OF HAMPTON.

No sewers.

TOWNSHIP OF HARDYSTON.

Estimated population, 2,700. No sewers.

TOWNSHIP OF LAFAYETTE.

Estimated population, 700. No sewers.

TOWNSHIP OF MONTAGUE.

No report.

TOWNSHIP OF NEWTON.

Estimated population, 4,500. Water supplied by gravity. Estimated consumption per diem for each inhabitant, 25 gallons. No sewers.

TOWNSHIP OF SANDYSTON.

No sewers.

TOWNSHIP OF SPARTA.

Estimated population, 2,300. No sewers, excepting street drains.

TOWNSHIP OF STILLWATER.

No sewers.

TOWNSHIP OF VERNON.

No sewers.

TOWNSHIP OF WALPACK.

No report.

TOWNSHIP OF WANTAGE.

No sewers.

UNION COUNTY.

TOWNSHIP OF CLARK.

No sewers.

TOWNSHIP OF CRANFORD.

1. Population by the last United States census—1,500.
2. Estimated population at present time—2,800.
3. Character of population—Manufacturing, urban or suburban? Suburban.

4. Topographical character—Hilly, undulating or flat? Undulating.

5. Supply of water—By gravity or pumping? Gravity.

6. Estimated consumption of water per diem for each inhabitant? Six gallons.

7. Sewerage or none? Yes.

8. (*a*) Is sewerage combined, separate or both? Separate.

10. (*a*) Are the present sewers adequate for storm service? Not intended for such.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes? About 10 miles; pipe varying from 8 to 20 inches.

(*b*) Number of manholes, with average distance between manholes? 230; 200 to 400 feet apart.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Ten per cent.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes.

(*b*) If so, where? Rahway river below tide-water.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet if only one, and the daily discharge of the various outlets if more than one—About 2,000 gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Yes. By town committee.

21. What is the charge for tapping the sewers? $2.00.

25. If not known separately, number of total connections. 238.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September? About one mile per hour.

JOHN H. CROMWELL,
Chairman of Township Committee.

Cranford, N. J., September 9th, 1899.

CITY OF ELIZABETH.

1. Population by the last United States census—43,765.

2. Estimated population at present time—50,000.

3. Character of population—Manufacturing, urban or suburban? About half manufacturing, and remainder urban and suburban.

4. Topographical character—Hilly, undulating or flat? Flat.

5. Supply of water—By gravity or pumping? Gravity.

6. Estimated consumption of water per diem for each inhabitant—100 gallons.

8. (*a*) Is sewerage combined, separate or both? Combined.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year. About 23 miles of streets paved, and 75 miles unpaved. Annual amount of paving not regular. In 1899 about 2 miles.

10. (*a*) Are the present sewers adequate for storm service? Yes, in ordinary cases.

(*b*) If not, is the enlargement of the sewers under contemplation? No, but other relief sewers to be built soon.

11. (*c*) Miles of brick sewer and miles of pipe sewer with sizes—12½ of brick sewer of various sizes, 2-foot by 3 foot to 5-foot by 7-foot 6 inches, 29 more or less miles pipe sewers of various sizes.

12. If combined system is in use, is provision made for ground-water entering sewers? No, except it may leak in.

13. (*b*) Number of manholes, with average distance between manholes—100 feet apart.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? To some extent.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? No.

(*b*) If so, where? At various points on the river and the sound.

(*c*) If there are various points of discharge state how many and into what places do the various outlets discharge—13 points of discharge, into tidal stream and ditches.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? $3 and $5, depending on whether street is paved or not.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July, August and September—Streams are tidal.

General Remarks.

Answers to the above questions have been made as well as the undersigned is informed.

A. B. CARLTON,
Comptroller.

TOWNSHIP OF FANWOOD.

Estimated population, 2,000. No water-supply. No sewers.

BOROUGH OF FANWOOD.

Estimated population, 350. Water supplied by pumping, from Plainfield Water-Supply Company.

TOWNSHIP OF LINDEN.

Estimated population, 1,200. No water-supply. No sewers.

BOROUGH OF LINDEN.

Estimated population, 400. No water-supply. No sewers.

BOROUGH OF MOUNTAINSIDE.

Estimated population, 450. No water-supply. No sewers.

TOWNSHIP OF NEW PROVIDENCE.

No water-supply. No sewers.

CITY OF PLAINFIELD.

1. Population by the last United States census—13,629 (1895).

2. Estimated population at present time—15,000.

3. Character of population—Manufacturing, urban or suburban? Partly manufacturing, mainly suburban.

4. Topographical character—Hilly, undulating or flat? Hilly in eastern section; flat elsewhere.

5. Supply of water—By gravity or pumping? Pumping from wells.

6. Estimated consumption of water per diem for each inhabitant—100 gallons for those using this water.

7. Sewerage or none? Yes.

8. (*a*) Is sewerage combined, separate, or both? Storm sewers and separate sewers for house drainage.

(*b*) If both, how much of each? Storm sewers, 2.93 miles; sanitary sewers, 24.407 miles.

10. (*a*) Are the present sewers adequate for storm service? No; more are needed in some districts.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—

8-inch	17.946	miles.
10- "	1.463	"
12- "	1.682	"
15- "	1.163	"
18- "	.716	"
24- "	1.437	"
	24.407	"

(*b*) Number of manholes on sanitary sewers, with average distance between manholes—198. 400 to 700 feet apart.

(*c*) Are all sewers straight both in line and grade between manholes? Yes, except some angles at lamp-holes.

(*d*) Does ground-water enter into the sewers? Yes, at high-water, in a few sewers.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Not known, as iron pipe has been laid for half a mile since last high-water level.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes.

(*b*) If so, where? At disposal beds.

16. (*a*) Is there any treatment of sewage before discharge? Yes, by intermittent filtration through sand.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

(*b*) If not, state in what area the sewage is pumped, and the number of gallons of sewage delivered at the pump, and the amount daily pumped? (In future extensions to the southeast, pumping will be required.)

18. State daily discharge of one outlet, if only one? Sanitary sewers, 550,000 gallons per day.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? Yes.

21. What is the charge for tapping the sewers? One dollar (city fee).

22. Number of house connections—1,321.

23. Number of factory connections—4.

27. If the sewage is subjected to treatment for its purification before final discharge, has the result of purification been satisfactory? The effluent is clear, with only slight odor. I have received no complaints about the beds this season.

General Remarks.

The total flow is calculated from depth of flow in 24-inch main sewer.

GEO. W. ROCKFELLOW, *Mayor.*

CITY OF RAHWAY.

No report.

BOROUGH OF ROSELLE.

1. Population by the last United States census—Part of Linden township.

2. Estimated population at present time—2,500.

3. Character of population—Suburban.

4. Topographical character—Slightly undulating.

5. Supply of water—By gravity.

6. Estimated consumption of water per diem for each inhabitant—Don't know; supplied to individuals by the Union Water Company.

8. (*a*) Is sewerage combined. Separate.

10. (*a*) Are the present sewers adequate for storm service? No.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

11. (*b*) Number of silt-basins—13.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes—8¼ miles; size, from 8″ to 22″.

(*b*) Number of manholes, with average distance between manholes—169; 260 feet apart.

(*c*) Are all sewers straight, both in line and grade, between manholes? Yes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Probably two-thirds.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? Yes.

(*b*) If so, where? West branch of Morse's creek, at tide-water.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? No.

17. (*a*) Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one—Outlet pipe, twenty-two inches; runs about one-sixth full.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Only under official supervision.

21. What is the charge for tapping the sewers? $8; one-half returned when street is repaired to satisfaction of Street Committee.

22. Number of house connections—188.

26. If sewage is discharged into a stream or other water without treatment, state the average flow of stream for the months of July August and September—Tide-water, five feet at low tide.

General Remarks.

Our sewerage system is known as the sanitary separate system, constructed under the direction of Carl H. Bassett, of Summit, N. J., and is entirely satisfactory in every respect.

WILLIAM T. WEST,
Mayor.

Roselle, N. J., September 4th, 1899.

TOWNSHIP OF SPRINGFIELD.

No sewers.

TOWNSHIP OF SUMMIT.

No report.

TOWNSHIP OF UNION.

Estimated podulation, 3,500. Water supplied by Plainfield Water Company. No sewers excepting private sewer at Elmore Village, about 3,000 feet in length, emptying through sewers of city of Elizabeth into Elizabeth river, used principally for surface-water, and having twelve or fifteen house connections. Sewer system is contemplated.

TOWNSHIP OF WESTFIELD.

1. Population by the last United States census—3,434.
2. Estimated population at present time—4,800.
3. Character of population—Suburban.

4. Topographical character—Hilly, undulating and flat.

5. Supply of water—By gravity or pumping? Gravity.

6. Estimated consumption of water per diem for each inhabitant—Supplied by private corporation.

7. Sewerage or none? Yes.

8. (*a*) Is sewerage combined, separate or both? Separate.

9. If combined sewerage is in use, the number of miles of streets paved and unpaved, and the annual amount of paving done per year—No paving.

10. (*a*) Are the present sewers adequate for storm service? No.

(*b*) If not, is the enlargement of the sewers under contemplation? No.

13. If separate system is in use—

(*a*) The number of miles of pipe, with sizes? Twelve miles of 8-inch, 10-inch, 12-inch, 15-inch and 18-inch.

(*b*) Number of manholes, with average distance between manholes? 150; no regular distance.

(*c*) Are all sewers straight, both in line and grade, between manholes? Straight, between manholes and lampholes.

(*d*) Does ground-water enter into the sewers? Yes.

(*e*) If so, what proportion of ground-water to sewage flows into the pipes? Ground-water, 75 per cent.

14. Are the sewers kept carefully clean? Yes.

15. (*a*) Are sewers concentrated into one point of discharge or not? They are, into disposal beds.

(*b*) If so, where? About two miles south of depot.

16. (*a*) Is there any treatment of sewage before discharge? No.

(*c*) Are there any storage-tanks? Yes.

17. Do all the sewers flow by gravity? Yes.

18. State daily discharge of one outlet, if only one, and the daily discharge of the various outlets, if more than one? About 20,000 gallons.

19. Is there a complete system of inspection, care and maintenance of the sewers? Yes.

20. (*a*) Does the city make its own connections in the street to the sewers, or do outside parties? Outside parties.

(*b*) And if so, are the latter duly licensed? No.

21. What is the charge for tapping the sewers? $3.

22. If not known separately, number of total connections? 472.

27. If the sewage is subjected to treatment for its purification before final discharge, has the result of purification been satisfactory? Filtration system used; purification satisfactory.

J. A. DENNIS,
Chairman Township Committee.

WARREN COUNTY.

TOWNSHIP OF ALLAMUCHY.

Estimated population, 600. No water-supply. No sewers.

TOWNSHIP OF BELVIDERE.

No sewers.

TOWNSHIP OF BLAIRSTOWN.

Estimated population, 1,610. No water-supply. No sewers.

TOWNSHIP OF FRANKLIN.

No water-supply. No sewers.

TOWNSHIP OF FRELINGHUYSEN.

Population, 1,042. No water-supply. No sewers.

TOWNSHIP OF GREENWICH.

No report.

TOWN OF HACKETTSTOWN.

No report.

TOWNSHIP OF HARDWICK.

Estimated population, 450. No sewers.

TOWNSHIP OF HARMONY.

No report.

TOWNSHIP OF HOPE.

Estimated population, 1,300. No water-supply. No sewers.

TOWNSHIP OF INDEPENDENCE.

No sewers.

TOWNSHIP OF KNOWLTON.

Estimated population, 1,530. No water-supply. About 500 feet of 6-inch sewer pipe for surface drainage only, emptying at one point of discharge into Delaware river.

TOWNSHIP OF LOPATCONG.

Estimated population, 1,800. No water-supply. No sewers.

TOWNSHIP OF MANSFIELD.

No sewers.

TOWNSHIP OF OXFORD.

No report.

TOWNSHIP OF PAHAQUARRY.

Estimated population, 400. No sewers.

TOWN OF PHILLIPSBURG.

Town partially sewered. Combined sewers, 19,852 feet. Storm sewers, 2,816 feet. Separate house sewers, 451 feet. At present these are adequate for storm service and no enlargement is contemplated. There are 9 silt-basins and about 80 inlets.

Miles of brick sewer and miles of pipe sewer, with sizes:

Brick Sewer—

4′ x6′	690 feet.
3′ 4″x5′	1,500 feet.
3′ x4′ 6″	1,300 feet.
2′ 6″x3′ 9″	1,170 feet.
3′ x4′ 6″	960 feet.
	5,620 feet.

Pipe Sewer—

24″	3,280 feet.
20″	300 feet.
18″	4,361 feet.
15″	4,559 feet.
12″	4,999 feet.
	17,499 feet.

Provision is made for ground-water entering sewers.

There is also 451 feet of separate house sewer, 12-inch pipe.

There are 60 manholes, about 250 feet apart. The sewers are straight in line and grade between manholes. They are kept clean and discharge, without treatment, at 3 places into the Delaware river. There are no storage-tanks and the sewers flow by gravity. The charge for tapping sewers is $25. There are two factory connections.

TOWNSHIP OF POHATCONG.

No sewers.

TOWNSHIP OF WASHINGTON.

No report.

BOROUGH OF WASHINGTON.

Estimated population, 4,000. Water supplied by gravity. About one and a half miles of six, eight and ten-inch pipe separate sewer, having 45 house and two factory connections, and emptying at one point of discharge into Shattecong creek.

ADDENDA.

BERGEN COUNTY.

BOROUGH OF CLIFFSIDE PARK.

2. Estimated population, 850.
4. Topographical character—High ground, on top of Palisades.
5. Supply of water—Partly by Hackensack Water Company, partly by wells.
7. One private sewer at northern part of borough.
8. Sewerage combined.
9. Part of streets macadamized.
10. Present sewers are adequate for storm service.
11. (*a*) One-quarter mile of combined sewer.
    (*b*) Two silt-basins.
    (*c*) 1,500 feet of 10-inch pipe sewer. No brick sewer.
12. No provision made for ground-water entering pipes.
13. Two manholes, five hundred feet apart. Sewers are straight in line and grade between manholes. No ground-water enters sewers.
14. Sewers are kept clean.
15. Sewers are concentrated into one point of discharge in Hudson river.
16. Sewage is not treated. There are no storage-tanks.
17. Sewers flow by gravity.
18. Estimated discharge—1,000 gallons per day.
19. There is a complete system of inspection, care and maintenance.
20. Connections are made by private land company.
21. There is no charge for tapping sewers.
22. There are six house connections and no others.

APPENDIX.

Law Recommended by the State Sewerage Commission to the Legislature, Session of 1900.

Law Recommended by the State Sewerage Commission.

AN ACT entitled "An act to amend an act entitled 'An act to prevent the pollution of the waters of this state by the establishment of a state sewerage commission, and authorizing the creation of sewerage districts and district sewerage boards, and prescribing, defining and regulating the powers and duties of such commission and such boards.'"

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

That the act entitled "An act to prevent the pollution of the waters of this state by the establishment of a state sewerage commission, and authorizing the creation of sewerage districts and district sewerage boards, and prescribing, defining and regulating the powers and duties of such commission and such boards," approved March 24, 1899, be amended so as to read as follows:

1. It shall be the duty of the governor, within thirty days next succeeding the approval or passage of this act, to appoint, by and with the advice and consent of the senate, five citizens of this state, to compose and be known as "the state sewerage commission;" in the original nomination of the members of said commission to the senate, the governor shall designate one of them to serve for one year, and two for two years and two for three years; and, thereafter, the members of said commission shall be appointed by the governor, by and with the advice and consent of the senate, for the term of three years and until their successors are duly appointed, confirmed and qualified; any vacancy occurring in said commission when the legislature is not in session shall be filled by appointment of the governor, until the next regular session of the legislature, when such vacancy shall be filled in the manner hereinbefore provided; but any such last-mentioned appointment and confirmation by the senate shall be for the unexpired term only; members of said commission, before entering

upon the duties of their office, shall make and subscribe an oath or affirmation (before some person authorized by the laws of this state to administer the same) to truly, faithfully and impartially perform and discharge the duties of their office according to law and file the same with the secretary of state; the terms of office of the members of said commission (except those appointed by the governor to fill vacancies as aforesaid) shall commence on the first Monday of May next succeeding their appointment by the governor and confirmation by the senate; on the first Monday of May next succeeding the original appointment of said commission, the members thereof shall meet at the state house in the city of Trenton, and organize by the election of one of their number to be chairman of said commission and one to be treasurer thereof, which officers shall hold office at the pleasure of the commission; after having so met and organized, subsequent meetings of the commission shall be held at such times and plaees as the commission may direct or as it may be called to meet by the chairman.

2. Said commission shall keep a record of all its proceedings and transactions, also full and accurate account of its receipts, disbursements, expenditures, assets and liabilities, and shall annually report to the legislature its operations, proceedings and transactions for the preceding year, with a statement or abstract of such receipts, disbursements, expenditures, assets and liabilities.

3. The members of said commission shall each receive an annual salary of fifteen hundred dollars, to be paid as other salaries of state officers are paid; said commission may have a secretary (not a member of the commission), to be appointed by the commission, or a majority thereof, who shall hold his office at the pleasure of the commission, or a majority thereof, and receive such salary as the commission, or a majority thereof, with the approval of the governor, may fix; said commission, or a majority thereof, may also from time to time employ or appoint such experts, engineers, officers, agents, employes, workmen and servants, as it may deem necessary or proper, to enable it to perform its duties and carry out the objects and purposes of this act; and said commission, or a majority thereof, may fix and determine the duties and compensation of said experts, engineers, officers, agents, employes, workmen and servants, and remove or discharge the same or any of them at pleasure.

4. It shall be the duty of the secretary to keep a record of all the proceedings and transactions of the commission, to prepare the annual

report to the legislature and perform such other duties as the commission may require; it shall be the duty of the treasurer to take charge of the moneys received by the commission, to keep accurate accounts of the receipt and disbursement thereof, and to deposit and pay out said moneys as the commission may direct, and under such rules and regulations as it may from time to time establish; the treasurer may be required to give bond to the commission for the due and faithful performance of his duties as such treasurer, in such sum and with such sureties as the commission, or a majority thereof, may require and approve.

5. It shall be the duty of said commission to investigate the various methods of sewage disposal, either in this country or elsewhere, in order that it may be able to make proper recommendations in regard thereto; it shall investigate all complaints of pollution of the waters of this state which shall be brought to its notice, and if the said commission find that any of the waters of this state are being polluted, to the injury of any of the inhabitants of this state either in their health, comfort or property, it shall be the duty of said commission to notify in writing any person, corporation or municipality found to be polluting said waters; that prior to a time to be fixed by said commission, which time shall not be more than five years from the date of said notice, said person, corporation or municipality must cease to pollute said waters and make such disposition of their sewage or other polluting matter as shall be approved by the state sewerage commission.

6. It shall be unlawful for any person, corporation or municipality to build any sewer, drain or sewerage system from which it is designed that any sewage or other harmful and deleterious matter, solid or liquid, shall flow into any of the waters of this state so as to pollute or render impure said waters, except under such conditions as shall be approved by the state sewerage commission; *provided*, that the provisions of this section shall not be deemed to prohibit the use or extension of existing sewers, drains or sewerage systems, unless the person, corporation or municipality controlling said sewer, drain or sewerage system shall be served with a notice to cease pollution, as provided by the fifth section of this act.

7. It shall be unlawful for any person, corporation or municipality, to build, or cause to be built, or operate any plant for the treatment of sewage or other polluting substance from which the effluent is to flow into any of the waters of this state, except under such conditions

as shall be approved by the state sewerage commission, to whom any new plans shall be submitted before building.

8. It shall be unlawful for any person, corporation or municipality, after being served with a notice to cease polluting any water or waters, as provided by the fifth section of this act, to permit or allow any sewage or other polluting matter to flow into said waters from any sewer, drain or sewerage system under the control of said person, corporation or municipality, except under such conditions as shall be approved by the state sewerage commission.

9. It shall be lawful for the commission to apply to the court of chancery of this state for a writ or writs of injunction to prevent the violation of the provisions of this act, and it shall be the duty of the said court in a summary way to hear and determine the merits of said application and to restrain, in all such cases, any person, corporation or municipality from polluting any of the waters of this state in violation of the provisions of this act.

10. On or before the first day of January, one thousand nine hundred, and thereafter, whenever required by said commission, the mayor of every municipality and the chairman of every township committee of every township now having, using, owning, leasing or controlling a sewerage plant or system, shall furnish to said commission, on blanks to be provided by said commission, a statement showing the disposition made of the sewage of their respective municipalities or townships, and, as near as possible, the amount discharged each twenty-four hours, and such other information and data as may be called for by said blanks to be provided as aforesaid by said commission.

11. To enable said commission to carry out and enforce the provisions of this act, the said commission may expend such sums of money as shall be duly appropriated.

12. And whereas, in order to prevent the pollution of the waters of this state, it is deemed necessary to establish a proper system or systems of sewerage and drainage wherein may or may not be included a system or systems of sewage-disposal works for the scientific treatment and proper disposal of sewage and sewage matter and the effluent thereof, and the establishment of any such system or systems may render proper or necessary the formation or creation of sewerage districts embracing portions or the whole of the territory of two or more of the municipalities of this state, within which

districts such system may be constructed, maintained and operated, and such municipalities may be unable, through lack of power and authority, or otherwise, to agree upon the establishment of any such system or systems or upon the extent or limits of the territory of their respective municipalities to be included in any such district or districts and devoted to the uses and purposes of any such system or systems as aforesaid; therefore, upon presentation to said the state sewerage commission of a petition in writing, setting forth that in order to prevent the pollution of the waters of this state, or any of them, it is proper or necessary that portions or the whole of the territory of two or more of the municipalities of this state should be erected into a sewerage district for the construction, maintaining and operation within such district of a system of sewerage and drainage or a system of sewage-disposal works, or of both such systems, and naming each municipality, the whole or any portion of the territory whereof it is proposed shall be included in such district, and stating generally the boundaries and outlines of such proposed district with sufficient exactness to show approximately the quantity or extent of territory of each municipality to be embraced in such proposed district, and requesting said commission to create and establish such district for either or both of the purposes aforesaid; and if said petition be signed by the mayors or other chief executive officers of three-fourths of the municipalities named in said petition, any of whose territory is proposed to be included in said district, said signatures being respectively affixed to said petition by authority or direction of the respective governing bodies of such municipalities (full power and authority to authorize and direct the signing of any such petition being hereby conferred upon and vested in all such governing bodies), and the signing of said petition by such authority or direction, being made to appear by affidavit or other due proof thereof, it shall be lawful for said the state sewerage commission to appoint a time and place when and where it will attend and give public hearing of the matters contained in said petition to all persons and parties interested therein; said commission shall cause at least twenty days' notice to be given of the time and place of any such hearing by publishing the same in a newspaper or newspapers, if any, published within said proposed district, and if none be published therein, then in a newspaper or newspapers published in the neighborhood of said proposed district and circulating therein; said notice may also, at the

discretion of said commission, be published in the newspaper or newspapers published outside of said proposed district, whether or not any paper or papers be published within the same; said commission shall also, at least ten days prior to the day fixed for such hearing, cause notice of the time and place thereof to be mailed to or served upon the mayor or other chief executive officer of any and all municipalities named in said petition, any territory whereof is included in said proposed district; and said commission may, if it deem proper so to do, require a copy of said petition to be mailed to or served upon such mayors or other chief executive officers such number of days prior to said hearing as it may direct; said hearing may be adjourned from time to time as said commission may decide; the sessions of said commission on said hearing or any adjournment thereof, when sitting for the taking of testimony or hearing argument to counsel, shall be open and public, and witnesses may be examined under oath or affirmation, which any member of said commission or the secretary thereof is hereby authorized and empowered to administer; the secretary of said commission shall attend at all such hearings and keep minutes of the proceedings thereat; said commission may, if it deem proper to do so, employ a stenographer to take and transcribe the testimony produced before it at any such hearing; and said commission may require the persons or parties presenting to it any such petition as aforesaid to pay in advance or assume or guarantee to pay all or such part of the costs, charges and expenses to be made or incurred by reason of the filing of said petition and subsequent proceedings to be had thereupon or thereunder, as said commission may think proper.

13. If, after such hearing, said commission, or a majority thereof, shall deem it advisable to comply with the request of said petition, and that a district for the purpose or purposes, or either of them therein stated, should be created and established, said commission shall adopt a resolution to that effect, defining the limits and boundaries of such district with certainty and declaring the territory included within such limits and boundaries to be a sewerage district, within which a system of sewerage and drainage, or a system of sewage-disposal works, or both, may be constructed, maintained and operated under the provisions of this act; the said district shall be called and known as "sewerage districts," and the boards to construct, maintain and operate the system or systems of sewerage or sewage-disposal works within such districts shall be called and known as "sewerage boards";

in and by said resolution, said commission shall assign to the district therein and thereby established a name and number, thus, "sewerage district number ———," and shall also specify the name by which the board thereafter to be elected in such district shall be called and designated, thus, "sewerage board of district number ———," the number of any such district and that of the sewerage board therein to be always the same; the first sewerage district created and established under this act shall be "sewerage district number one," the second, number two, and so on in regular order as the same may be respectively created; said commission shall also cause a map to be prepared of said district so created and established, whereon and whereby shall be shown with accuracy the limits and boundaries of such district, of what municipalities the lands included in said district form a part and what extent or quantity of territory of each municipality (whether the whole or a portion thereof) is included in said district; the original of said map shall be filed with said commission, and within ten days after the adoption of said resolution, a copy thereof and of said map shall be filed in the office of the secretary of state and in the clerk's office of each county in which any of the lands included in said district may be situate; and from and after the filing of such resolution and maps as aforesaid, the territory included in said district as stated and shown in and by said resolution and map shall be deemed to be and constitute a sewerage district by the name and number and for the purposes stated in said resolution.

14. After the creation and establishment of any sewerage district as aforesaid, an election shall be held therein at the same time as the next annual election for members of assembly shall be held throughout this state, which election in said sewerage district shall be held and conducted between the same hours, at the same places, and by the same officers as said election for members of assembly shall be held and conducted; at such first election the legal voters resident in said district shall elect five persons, resident in said district, to be members of and compose the "sewerage board of district number———," as the case may be; and annually thereafter, at an election to be held at the same time and place and by the same officers as the election for members of assembly shall be held and conducted, the legal voters resident in said district shall elect one person, resident in said district, to be a member of said sewerage board, to serve for the term of five years, as hereinafter provided; any vacancy in any such board occurring other-

wise than by lapse of time shall be filled by appointment of the governor (if he shall deem it necessary to fill such vacancy), such appointee to serve until the second Tuesday in December next succeeding his appointment, and his successor to be elected at the election for members of the assembly held next preceding such second Tuesday in December in the manner hereinbefore provided.

15. Nominations for said offices as members of said sewerage boards may be made by district conventions (that is to say, sewerage districts), or by petition signed by at least one hundred and fifty voters resident in the sewerage district, in the same manner as now provided by law for the nomination of state or county officers.

16. The election board of any election district not wholly within a sewerage district, but which election district embraces territory included in any sewerage district, shall designate on their registry lists, so far forth as they may be able to do, in such manner as they may choose to adopt, the names of voters of their election district who reside within any sewerage district which includes territory embraced in said election district, and the board of freeholders of the county in which such election district is situate shall furnish and provide such election boards with a ballot-box, in which box shall be deposited the votes voted for members of the sewerage board, and only such votes.

17. The ballots intended to be voted in any sewerage district, under the next preceding section, besides the party name, shall have printed thereon only the name or names of the person or persons to be voted for as member or members of such sewerage board, under a proper designation of the officers to be voted for, thus "for members (or member) of sewerage board of district number ———;" said ballots, when voted, shall be inclosed in an envelope, the ballots and envelope to be provided and furnished by the county clerks in the same manner as ballots and envelopes are now provided and furnished in elections for members of assembly; the envelopes shall have indorsed or printed on the face thereof "sewerage ballot, district number ———," as the case may be; said ballots and envelopes shall be furnished by the election board to each voter entitled to vote in the sewerage district, in the same manner and at the same time as the ballots for member of assembly are furnished him; after the vote of any person shall have been deposited for member of assembly, such person, if he be entitled to do so, shall and may offer his ballot for member or members of the sewerage board to be voted for at that election; the

chairman of the election board shall thereupon announce the name of the voter, and that he offers a ballot for member or members of the district sewerage board, and if the name of such voter be found registered and designated as entitled to vote in such sewerage district, the ballot shall be deposited in the box provided for such ballots, unless the voter be challenged and the board of election reject the ballot offered for due and legal reasons; the clerks of election shall keep a separate list of all voters who shall vote in any sewerage district, and such list shall contain only the names of persons who have voted for member or members of the district sewerage board; if the name of any person offering a ballot for member or members of the district sewerage board shall be found registered as aforesaid, but not designated as entitled to vote in such sewerage district, the vote of such person shall not for that cause alone be rejected; *provided*, such person shall, by affidavit or other proof, satisfy said board of election that he is a resident in the sewerage district and in all respects qualified and entitled to vote for member or members of the district sewerage board at that election.

18. In any election district included wholly within the limits of any sewerage district, the ballots for member of assembly shall have printed thereon, under a proper designation as aforesaid, the name or names of the persons to be voted for as members of the district sewerage board, and said ballots shall be voted at the same time and in the same manner and canvassed and returned in like manner as ballots for member of assembly.

19. In election districts having a separate ballot-box for members of a district sewerage board, after the votes for member of assembly shall have been counted, the board of election shall count the votes for member or members of district sewerage board contained in said separate box, and said votes shall be counted, canvassed and returned in the same manner as the votes cast for member of assembly.

20. The county boards of canvassers in each county shall canvass the votes cast for members of any district sewerage board in their respective counties in the same manner and at the same time as the vote for members of assembly is canvassed, and make return thereof to the county clerks of their respective counties.

21. On the second Monday next following the meetings of the county boards of canvassers the clerk of each county, any part whereof is included within a sewerage district, shall meet at the clerk's office of

that county which, according to the next preceding state or federal census, had the largest population, at the hour of twelve o'clock noon, and then and there canvass the votes cast in such sewerage district and prepare a certificate of the result and mail the same to the secretary of state within two days thereafter; a copy of said certificate shall also be prepared and within said two days mailed to each person elected a member of such sewerage board, which copy of such certificate shall be the commission or warrant of such person as a member of such board.

22. The members of any district sewerage board first elected shall meet on the second Tuesday in December next following their election, at the office of the county clerk where the result of such election was canvassed, at the hour of twelve o'clock noon; each member of said board (and all members thereof afterwards elected or appointed thereto) shall take and subscribe an oath or affirmation, before some person authorized to administer the same, to faithfully and truly perform his duty as member of such board to the best of his ability, and within two days after making thereof forward the same to the secretary of state; said board, when met as aforesaid (the members thereof having each made and subscribed said oath or affirmation), shall organize by the election of one of their number as chairman, one as secretary and one as treasurer; immediately after such organization they shall proceed to determine by lot one of their number to serve for the term of one year, one for the term of two years, one for the term of three years, one for the term of four years and one for the term of five years; thereafter all persons elected to be members of said board shall serve for the full term of five years, and the terms of all members thereof shall commence on the second Tuesday in December next following their election; the chairman, secretary and treasurer of said commission shall respectively serve for the period of one year and until their successors are elected; a certificate or statement of such meeting and organization of said board shall, on the day of such meeting, be prepared and mailed to the secretary of state, to be filed in his office; meetings of said board subsequent to such first meeting for organization shall be held at such times and places as the board may decide or as it may be called to meet by the chairman.

23. From and after such meeting and organization of said board and the filing of such certificate as aforesaid, said board shall be deemed to be and shall be a body politic and corporate, under the

same name and title as that designated and specified in the resolution of the state sewerage commission creating and defining the said sewerage district, to wit, "sewerage board of district number———," and by such name and title said sewerage board shall have perpetual succession, with power to sue and be sued and the right, power and authority to acquire, hold, use and dispose of all such property, real or personal, as may be proper or necessary for the objects, uses and purposes for which said sewerage board was created, and with all other powers necessary or incident to bodies politic and corporate or that may be necessary or proper to carry out and affectuate the objects and purposes of this act and the objects and purposes for which said sewerage board was created

24. Any such board incorporated as aforesaid shall have full power and authority within its respective district, under the supervision, direction and control of the state sewerage commission as hereinbefore or hereinafter provided, to construct, maintain and operate in said district a system of sewerage and drainage, or of sewage-disposal works, or both, with the necessary pipes, drains, conduits, fixtures, pumping works, and other appliances for the purpose of taking up sewage and all other offensive and deleterious matter and convey the same to some proper place or places of deposit or disposal to be selected by the said board, there to be deposited, treated, disinfected or disposed of as to the said board may seem proper and as may be deemed most advantageous; and it shall be the duty of all persons and all corporate bodies and municipalities owning or controlling sewers or drains or having charge thereof within the limits of the district wherein intercepting or main sewers have been or may be constructed by the said board as herein provided, to cause the same to be connected therewith; and it shall be the duty of said board in constructing such main or intercepting sewers to have them so constructed that such connection can be made therewith at all necessary and proper points and places; all such connections shall be made in accordance with the rules and regulations from time to time adopted by the said board in relation thereto, and under the direction and supervision of its officers and agents.

25. The said board shall have power and authority to purchase and acquire all lands, rights or interests in lands, which may be deemed necessary for the construction of sewers, drains, disposal, pumping and other works authorized by this act; and if in any case the said board

shall be unable to agree with the owner or owners of any lands, rights or interests in lands deemed necessary by the said board in the construction of the works herein authorized, or when, by reason of the legal incapacity or absence of such owner or owners, no agreement can be made for the purchase thereof, the lands or rights in lands so desired shall be acquired in the manner provided by the general laws of this state relating to the condemnation of lands for public use.

26. Before determining upon the final plan or route for the building or construction of any work authorized by this act, the said board may, by its officers, agents, servants and employes, enter at all times upon any lands or waters for the purpose of exploring, surveying, leveling and laying out the route of any drain or sewer, locating any disposal, pumping or other works, establishing grades and doing all necessary preliminary work, doing, however, no unnecessary damage or injury to private or other property.

27. The said board shall have power and authority to construct any sewer or drain, by it to be made or constructed, under or over any water-course, under, over or across or along any street, turnpike, road, railroad, highway or other way, and in or upon private or public lands under water, in such way and manner, however, as not unnecessarily to obstruct or impede travel or navigation, and may enter upon and dig up any road, street, highway or private or public land, for the purpose of laying down sewers and drains upon or beneath the surface thereof, and for maintaining and repairing the same, and in general, may do all other acts and things necessary, convenient and proper for the purposes of this act; and whenever the said board shall dig up any road, street or way as aforesaid, it shall, as far as possible, restore the same to as good condition and order as the same was when such digging commenced.

28. The said board shall have power and authority also to alter or change the course or direction of any water-course, and with the consent of the board or body having control of the streets and highways in any city, town or municipality, to alter or change the location or grade of any highway, public street or way crossed by any sewer or drain constructed or to be constructed under the provisions of this act, or in which such sewers or drains may be located.

29. The said board shall at all times keep full and accurate accounts of its receipts, expenditures, disbursements, assets and liabilities, and shall annually make a report of its operations and doings, in which

report it shall include an abstract of such receipts, expenditures, disbursements, assets and liabilities, and publish the same in one or more newspapers published in each of the counties in said district.

30. To provide for the payment of the costs and expenses incurred or to be incurred by the said board in making the constructions and executing the work and performing the duties imposed upon it by this act, it shall have the power and authority from time to time to issue bonds in its corporate name, not to exceed that part of such cost and expense incurred in the work of constructing sewers, drains, disposal and other works, including the cost of lands, rights and interests in lands, of which a separate account is to be kept by said board as hereinafter provided; such bonds shall be of the form and payable at such time, not exceeding thirty years from the date thereof, and at such place, either in currency or coin, as the said board may determine; they shall bear interest at a rate not exceeding five per centum per annum; in issuing such bonds the said board may, in its discretion, make the same, or any part thereof, fall due at stated periods less than thirty years, or may reserve therein an option to redeem and pay the same or any part thereof at stated periods at any time between the date thereof and the date at which they would otherwise fall due, and all such bonds may be negotiated, sold or disposed of at not less than their par value, and the same or the proceeds thereof may be used by the said board for the purpose aforesaid.

31. The said board shall keep the costs and expenses of the construction of sewers, drains, disposal and other works, in which shall be included the cost of lands, rights and interests in lands, separate from the costs and expenses of maintenance, operation and repairs, and shall, after having prepared and adopted plans (which, however, the board or the state sewerage commission shall have the power to change or modify, if such change or modification shall be found necessary or desirable), make a careful estimate of the cost and expense of such construction, and shall divide and apportion the same, according to their best judgment, to and between the several municipalities or parts thereof, if any, included within such sewerage districts ratably and proportionally to the benefits received or to be received by such municipalities or parts thereof from such construction, and shall furnish to the governing body of each and every municipality, the whole or any part whereof is included in such sewerage district, a statement of such estimated cost and expense and of the division and apportion-

ment thereof as aforesaid, and service of said statement upon the mayor or other chief executive officer or upon the clerk of any municipality shall be deemed to be a service upon the municipality; if the governing body of any such municipality (whether a whole or only a part thereof is included in such sewerage district) shall be dissatisfied with such division and apportionment and shall within twenty days after service thereof as aforesaid express such dissatisfaction by a resolution adopted by a majority of such body, then it shall be lawful for such body, in the corporate name of such municipality, to make application to any justice of the supreme court of this state for the appointment of three disinterested persons, residents of this state, commission to review such division and apportionment, and correct, amend, revise, alter or confirm the same, as they or a majority of them shall deem just and proper, and it shall be the duty of said justice to make such appointment; the commissioners so appointed (having respectively taken and subscribed an oath or affirmation before some person authorized to administer the same faithfully and impartially to perform the duties imposed upon them) shall forthwith, at such time and place as they or a majority of them may appoint, and upon such notice as the said justice in the order appointing said commissioners shall direct to be given, hear the parties interested in such matter and such proofs and witnesses as may be produced before them; said commissioners may adjourn said hearing from time to time as occasion may require; on any such hearing the parties, if they so choose, may be represented by counsel, and the witnesses may be examined under oath or affirmation, which any of said commissioners are hereby authorized to administer; said commissioners may designate one of their number to act as chairman and one to act as clerk or secretary; at the conclusion of such hearing, and within ten days thereafter, said commissioners, or a majority of them, shall correct, amend, revise, alter or confirm such division and apportionment as they, or a majority of them, shall deem just and proper under the evidence and proofs produced before them, and shall make and sign a statement or certificate thereof, which statement or certificate shall be final and conclusive and binding upon all parties; the application for the appointment of such commissioners, the order of the justice appointing them, the oath or affirmation of said commissioners and their said statement or certificate shall, within two days after the making of said statement or certificate, be filed with the secretary of the sewerage

board which made the division or apportionment reviewed by said commissioners; and such sewerage board, within five days after the filing of such statement or certificate as aforesaid, shall cause a certified copy thereof to be served in manner aforesaid upon each of the municipalities that the original division and apportionment made by said sewerage board was served upon, which certified copy so served shall be in lieu and stead of that originally served, and (as aforesaid) be final and conclusive and binding upon all parties; if, in any case, where only a part of a municipality is included in a sewerage district, the governing body of such municipality shall not, within said twenty days after service upon it of any such original statement as aforesaid, adopt a resolution expressing its dissatisfaction as aforesaid provided, then, and in every such case, it shall and may be lawful for one or more of the residents and taxpayers, or residents and non-resident taxpayers of said sewerage district, to join in such application as aforesaid to any justice of the supreme court for the appointment of commissioners to review as aforesaid the said division and apportionment, and thereupon the said justice may, in his discretion, appoint such commissioners, and if such appointment be made, said commissioners shall proceed in the same manner, and the proceedings before them had shall be similar to those hereinbefore provided, and the statement or certificate of said commissioners made upon any such last-mentioned application shall be final and conclusive and binding upon all parties.

32. The said sewerage board shall also, in the manner hereinbefore directed, serve upon or furnish to each of said municipalities, after every issue and sale of bonds, a statement of the amount of such bonds and the rate of interest thereon, and the proportion of interest thereof allotted to each municipality (where such municipality is entirely within the sewerage district) or (where only a part of the municipality is included in the sewerage district) of the proportion of such division and apportionment allotted to the part of the municipality in said sewerage district; and it shall be the duty of each of said municipalities and of its proper officers in the next annual tax levy made in such municipality and in each succeeding year thereafter, to include and raise by taxation the amount required to pay the interest on the pro portion of such bonded indebtedness allotted to such municipality or part thereof, as the case may be, and if such municipality be entirely

within such sewerage district, then it shall be the duty of such municipalities to cause to be levied and assessed therein a sum equal to the amount of interest so apportioned and allotted to such municipality, together with such additional sum, to be divided and apportioned and allotted to and between said municipalities or parts thereof as aforesaid, as may be necessary to establish and maintain a sinking fund sufficient to pay the principal of the bonds issued by the said sewerage board under authority of this act, when the same fall due; if only a part of the municipality be included in the sewerage district, then it shall be the duty of such municipality and its proper officers, instead of levying and assessing the same upon the whole municipality, to cause in manner aforesaid the sum or sums that may as aforesaid be apportioned and allotted to such part of the municipality as is included in the sewerage district, to be levied and assessed in and upon such part of the municipality as is included in the sewerage district, in the same manner as other taxes may be levied and assessed therein; and it shall be the duty of all taxing officers and all collecting officers in the said municipalities to levy, assess and collect the said amount or sums so to be raised in such municipalities or parts thereof as the case may be; and it shall also be the duty of the collector of taxes in each of the said municipalities or other proper officer, to pay to the sewerage board thereunto entitled the money so levied, assessed and collected; after each census, state or national, a new allotment shall be made of the interest and sinking fund or redemption fund in the manner herein provided.

33. As soon as the work of construction by this act authorized (or the cost and expense of which a preliminary estimate shall have been made as herein provided) has been completed, the said board shall proceed at once to ascertain the actual cost and expense of such work, and shall furnish to each of the said municipalities or municipal divisions a statement of such cost and expense.

34. The cost of maintenance, operation and repairs, together with the cost of supervision, and all other expenses of every kind not included in the cost and expense of construction, shall be annually estimated by the said board and divided and apportioned between the said several municipalities or parts thereof upon the same basis as herein provided for the division of the cost and expense of construction; and the same, when so divided and apportioned, shall be levied, assessed, collected and paid annually in the same manner provided

for the levying, assessment and collection of the cost and expense of construction; *provided, however*, that if at the end of any year when such cost and expense shall have been accurately ascertained, such estimate shall have been found to have been more or less than the proper proportion of any such municipality, then the surplus or deficiency, as the case may be, shall be deducted from or added to the sum to be levied, assessed and collected for the succeeding year.

35. The said board shall, immediately after receiving from the said municipalities, or either of them, or from the collector or treasurer of any such municipality, any moneys on account of the apportionment made, as hereinbefore provided, or as soon thereafter as practicable, cause the same to be invested in securities, the character of which shall be the same as required by law for savings banks of this state, except so much thereof as may be required to pay interest due or to fall due during the current year; and all such funds, and the securities in which the same or any part thereof shall be invested, and the interest received therefrom, shall be held, used and applied by the said board as a sinking fund to meet and pay the interest and principal on the bonds issued by the said board under the authority of this act, and for no other purpose whatever, until all such bonds and all arrears of interest thereon are fully paid; it shall be the duty of said sewerage board to include in its annual report the amount of money received by it for the purposes aforesaid, the sources from which such money was received, and the investment of the same; and the said board shall keep a record and account of all bonds issued by it, when the same fall due, the time and place of payment, and the rate of interest thereon, and of the amount received on the sale or disposition thereof, and shall also keep an account of all moneys invested, held and used as a sinking fund, and of the securities in which the same may be invested; the books, records, accounts, papers and documents of the said board shall be open to the inspection of any person appointed by the governing body of any municipality within said district to inspect the same; *provided, however*, that in case the said board shall issue bonds which shall fall due and become payable at stated periods less than thirty years, or shall retain in any such issue the option to redeem bonds prior to the date at which they would otherwise fall due as hereinbefore provided, then it shall be lawful for the said board to make application of the moneys received by it from the several municipalities and of the funds

temporarily invested by the said board so received, for the purpose of paying off and discharging the said obligations according to their tenor and effect.

36. During the year preceding the year in which the bonds issued under the authority of this act shall fall due, the said board shall cause a careful computation to be made of the moneys that will be available for the payment of the same, and if it shall be found that any deficiency will exist in the fund that will be available therefor, after the application of moneys received and the use of all securities held, such deficiency shall be apportioned and allotted to the said municipalities in the same manner and upon the same basis as the original apportionment, and shall be added to the amount so levied, assessed, collected and paid by the said municipalities respectively, in the succeeding year; and if any excess shall be found to exist in such fund, the surplus shall be credited to each of the said municipalities in the same proportion and deducted from future estimates of the respective shares or proportions of such municipalities of the cost and expense of maintenance, operation and repairs.

37. In and about the performance and discharge of the duties imposed upon it by this act, any such sewerage board as aforesaid, or a majority thereof, may employ such experts, engineers, contractors, officers, agents, employes, clerks, workmen and servants as it may deem necessary or proper to enable it to perform its duties and carry out the objects and purposes of this act; and said board, or a majority thereof, may fix and determine the duties and compensation of such experts, engineers, contractors, officers, agents, employes, clerks, workmen and servants, and remove or discharge the same or any of them at pleasure.

38. The secretary of any such sewerage board shall keep a record of all the proceedings and transactions of said board; under the direction of said boards he shall prepare the estimate, division and apportionment provided for in section twenty-six hereof; he shall prepare the annual report of said board and perform such other duties as the board may from time to time require; the secretary shall receive an annual salary, to be fixed by the board, or a majority thereof, but he shall not receive any per diem allowance.

39. The treasurer of any such sewerage board shall have charge and custody of all moneys and securities received or owned or held by said board; he shall keep accurate record and account of the

receipt, disbursement and disposition of all such moneys and securities, and invest, deposit, dispose of, disburse and pay out the same at such times and in such manner as the board may direct, and under such rules and regulations as it may from time to time establish; the treasurer shall give bond to such board for the due and faithful performance of his duties as such treasurer in such sum and with such sureties as the board, by a unanimous vote, may require; the treasurer shall receive an annual salary, to be fixed and determined by the board, or a majority thereof, but he shall not receive any per diem allowance.

40. The members of any such board, except the secretary and treasurer thereof, when actually engaged in and about the business of said board shall receive a per diem compensation of five dollars; said per diem compensation, and the salaries to be paid the secretary and treasurer, shall be included in said estimate hereinbefore mentioned.

41. Any such sewerage board is authorized and empowered to rent an office or offices, as may be required for the due transaction and carrying out of its work and duties, and to properly equip and furnish such office or offices, the expense thereof to be included in said estimate mentioned in section thirty-four hereof.

42. This act shall take effect immediately.