A STUDY IN LOCAL DECISION MAKING: PITTSBURGH AND SEWAGE TREATMENT

GEORGE PETER GREGORY

Introduction

IN the late nineteenth and early twentieth centuries, increased urbanization, immigration, and industrialization created a number of social and environmental problems for American cities. The dramatic growth of urban populations required improvements in city services. Crowded living conditions resulted in demands for better housing, adequate water supplies, improved health facilities, and better methods of sanitation. At the same time, industries and commercial institutions required improved means of communication and transportation as well as an environment conducive to continued growth.

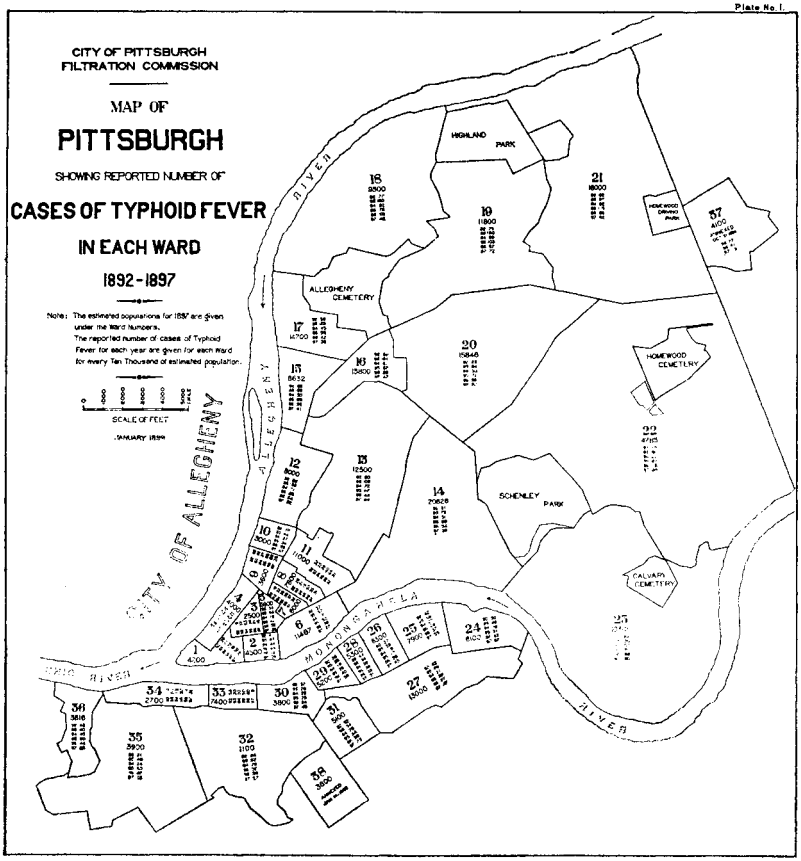
Public and private civic leaders employed a variety of alternative solutions to these problems. Health officials, housing reformers, and sanitary engineers developed ways to cope with the problems of disease, overcrowding, and urban sanitation. Other engineers and technologists attempted to devise mechanical remedies to transportation, communication, and environmental problems. Most urban communities, however, expressed concern for these problems only as conditions worsened. Few large cities proposed urban reforms based on long-range planning. Rather, crisis situations such as increased death rates from disease, rising crime rates, or inadequate city services stimulated civic actions.[1]

This paper examines the first major attempt at sewage treatment in Pittsburgh. In addition to defining the problem of sewage treatment, this study focuses on the proposed alternatives, the possible effects of these alternatives, and the rationale which supported the final policy. The arguments Pittsburgh's civic leaders employed to defend this final policy reflected their reliance on a short-term solution

---

Mr. Gregory, currently working for his D.A. in history under Dr. Joel A. Tarr at Carnegie-Mellon University, holds the position of instructor in history at that institution and is also a staff member of the Social Studies Curriculum Center there.—Editor

1 Arthur M. Schlesinger, "The Urban World," *American Urban History: An Interpretive Reader with Commentaries,* ed. Alexander B. Callow, Jr. (New York, 1969), 186-205.

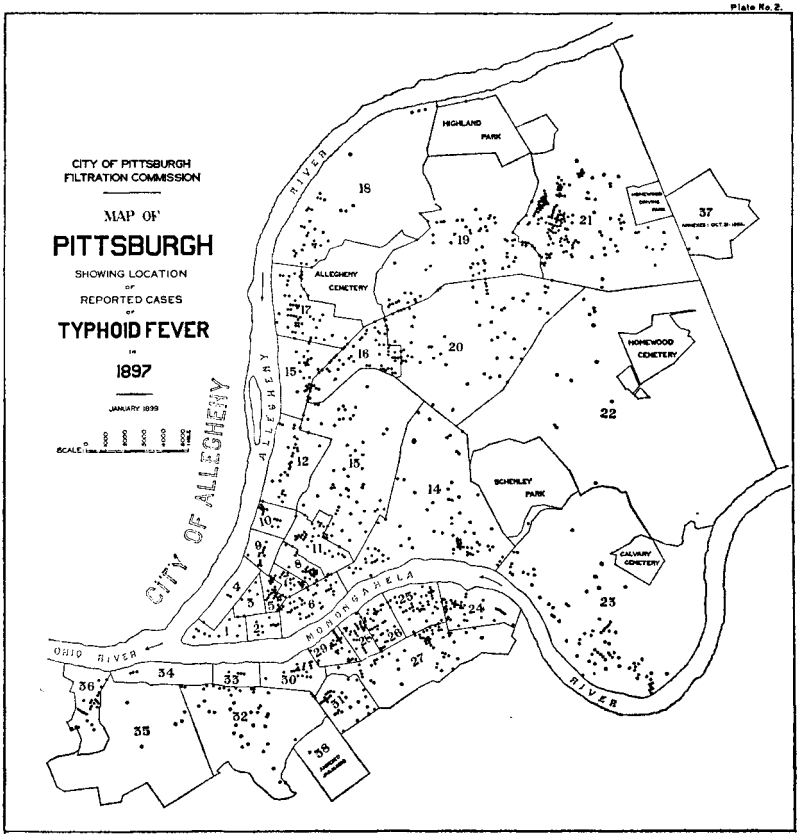


to Pittsburgh's sewage problem. At the same time, their arguments defended the need for economy-minded, efficiency-oriented decision making in government.

Typhoid Fever in Pittsburgh

During the late nineteenth century, the high number of deaths resulting from typhoid fever and diphtheria troubled Pittsburgh health officials and civic leaders. From 1873 to 1882, the Board of Health reported 1,284 deaths from typhoid fever.[2] During this same period, Pittsburgh's population increased from 86,076 to 156,389 residents.

2 See the *Annual Reports of Board of Health* and *Bureau of Health Reports* (Pittsburgh), for the years 1873-95.



This 82 percent increase in population, coupled with the lack of proper sewage treatment or water-filtration systems, threatened to increase deaths from typhoid fever and diphtheria.

By 1882, the increasing number of cases of typhoid fever influenced city officials to pass an ordinance which required Pittsburgh health officers and physicians to report all typhoid cases and deaths to the Board of Health (which became the Bureau of Health in 1888). Bureau and Board of Health reports show that from 1883 to 1908, one resident in every six suffered from typhoid fever. A total of 8,149 residents died from typhoid fever during this twenty-five-year period. The following list compares Pittsburgh's mortality rate per 100,000 residents with that of other large American and European cities for the period 1898-1909:

TABLE 1

MORTALITY RATES

Pittsburgh	130.0
Allegheny	104.4
Washington	59.9
Philadelphia	54.7
Boston	24.5
New York	18.2
Paris	17.4
London	11.7

SOURCE: Frank E. Wing, "Thirty-five Years of Typhoid," *Charities and Commons* 21 (Feb. 6, 1909) : 926.

Pittsburgh health officials traced the causes of this high typhoid-fever rate to a number of factors. One factor was "lax methods of handling food, drink, and wastes"; another was the lack of water filtration; while a third was inadequate sewage treatment and disposal. More than 350,000 residents of more than seventy-five upriver cities discharged their untreated sewage into the Allegheny and Monongahela rivers and contaminated Pittsburgh's water supplies. The Pennsylvania commissioner of health noted that "a great reduction in the cases in the afflicted districts [Pittsburgh and Allegheny City] would occur if the discharge of sewage into the Allegheny River were to be discontinued at once." [3]

The association of polluted water supplies with the high typhoid rates led to the creation of Pittsburgh's Filtration Commission on June 8, 1896. The Filtration Commission investigated alternative methods of water filtration and on February 6, 1899, recommended the construction of a slow-sand filtration system for Pittsburgh. A number of problems delayed completion of the water-filtration works at Aspinwall until October 1908, but once in operation the Pittsburgh typhoid-fever rate dropped dramatically. For example, the Bureau of Health reported 593 cases of typhoid fever in October 1907 but only 96 cases in October 1908. Table 2 lists Pittsburgh and Pennsylvania typhoid deaths per 100,000 residents from 1906 to 1909 and illustrates the effects of the water-filtration plant.

---

3 *Annual Reports, Pennsylvania Health Department, 1905-6* (Harrisburg, 1906), 1: 61-62 (herafter cited as *Pa. Health Reports*).

TABLE 2
TYPHOID DEATHS

Year	Pittsburgh	Pennsylvania
1906	141.3	56.5
1907	130.7	50.3
1908	46.4	34.3
1909	24.6	23.6

SOURCE: *Annual Reports, Pennsylvania Health Department, 1909* (Harrisburg, 1909), 4: 1446.

Completion of the water-filtration plant helped to relieve the threat of typhoid fever and diphtheria in Pittsburgh. However, boroughs and towns below Pittsburgh, such as Allegheny City, continued to suffer from contaminated drinking water. In November and December 1908, for instance, Allegheny City reported twice as many cases of typhoid fever as Pittsburgh.[4] The Pennsylvania commissioner of health reported in 1909 that twenty-six municipalities, with a total population of 70,300 people, drank unfiltered, sewage-polluted Ohio River water.[5] Sewage discharges by Pittsburgh and cities along the Allegheny and Monongahela rivers contributed to this water-supply and public-health problem. Construction of the Aspinwall Water Works ensured cleaner water and lower typhoid-fever rates for most Pittsburgh residents, but the city's inadequate sewage-treatment methods still created public-health problems for the cities and boroughs on the Ohio River.

Sewage Disposal in Pittsburgh

Like many American cities located near bodies of water, Pittsburgh's sewer lines were designed to discharge into nearby rivers and streams. The Monongahela, Allegheny, and Ohio rivers served as receptacles for domestic and industrial wastes. Throughout the nineteenth century, the Bureau of Highways and Sewers constructed sewer lines which drained various sections of the city. The first line, built in 1840, served sections of present-day Shadyside and Oakland before emptying into the Monongahela River. By 1898, Samuel T. Paisley, director of the Bureau of Highways and Sewers, reported the completion of 210 miles of underground sewer lines. These sewers included Negley Run, Two Mile Run, Forty-eighth Street Basin, Heights Run,

4 Wing, 933. See SOURCE, table 1.
5 *Pa. Health Reports, 1909,* 4: 1479.

Soho Run, Four Mile Run, and Nine Mile Run. Table 3 lists the miles of sewers completed and the cost of construction from 1888 to 1897:

TABLE 3
SEWER CONSTRUCTION

Year	Miles of Pipe	Cost	Miles of Brick	Cost
1888	16.54	$231,892	.33	$ 10,806
1889	6.68	123,502	4.15	137,904
1890	15.30	241,176	.18	11,480
1891	3.41	29,669	.83	264,592
1895	24.12	172,735	2.47	160,255
1897	15.88	146,322	.57	22,842
Totals	155.05	1,690,562	13.22	815,800

SOURCE: *Highways and Sewers Bureau, 1898* (Pittsburgh, 1898), 93.
NOTE: The totals include amounts for the years not given — 1892-94, 1896.

By 1908, 393.47 miles of sewer lines served Pittsburgh.[6] These sewers received untreated household and industrial wastes and deposited them into Pittsburgh's three rivers. Seventy-eight public sewers emptied into the Allegheny River below the Aspinwall Water Works; the Monongahela River received discharges from more than twenty-three sewers, while two-thirds of the South Side's sewers and twenty North Side sewers discharged into the Ohio River.[7] In addition, a number of relief sewers emptied into smaller streams which flowed into these rivers. For example, Nine Mile Run, which drained 4,300 acres, emptied into the Monongahela River, while Saw Mill Run, a stream which drained twenty square miles, flowed into the Ohio River below the Point.

A number of factors forced city officials and civic leaders to review the sewage-treatment techniques employed in Pittsburgh. The medical and scientific link between sewage-polluted drinking water and typhoid fever represented the most important factor. Although the water-filtration plant at Aspinwall helped to lower death rates in Pittsburgh, the high incidence of typhoid in towns on the lower Ohio River continued to threaten local residents. Supporters of sewage treatment noted that typhoid fever would spread to Pittsburgh from cities such as Allegheny City unless sewage pollution stopped. Another motivating factor resulted from a 1905 Pennsylvania law which required cities to

6 *Public Works Department, 1907* (Pittsburgh, 1907), 573.
7 *Pa. Health Reports, 1909,* 4: 1477-79.

file applications for permits to extend sewer lines which discharged into bodies of water used as water supplies.

An Act to Preserve Water Quality

The 1905 act was introduced by Algernon B. Roberts of Montgomery County. Roberts argued that the increase in typhoid fever was linked directly to drinking water contaminated with sewage. He supported sewage treatment and water filtration as solutions to the typhoid problem. Opponents of the Roberts bill focused on the effects the legislation would have on industry. Representative William Irwin (Blair County) and Senator Arthur Dewalt (Lehigh County) noted that the bill granted the commissioner of health power to refuse discharge permits to industries which polluted Pennsylvania's rivers and streams. Dewalt felt that strict enforcement of the law would close many factories and leave thousands of residents unemployed. On March 28, 1905, the bill passed in the state's house of representatives by a vote of twenty-eight to thirteen. Allegheny County senators David A. Wilbert and John W. Crawford supported the measure.[8]

On April 22, 1905, "an Act to preserve the purity of the waters of the State, for the protection of the public health" became law. The new law charged the Pennsylvania commissioner of health with the responsibility for protecting the waters of the state from sewage pollution. In order to reach this objective, the law required public and private authorities to file applications for permits to extend existing sewer systems which discharged into bodies of water. These applications included descriptions of existing sewer systems and proposed methods for sewage treatment. The commissioner was required to review each permit application and evaluate the effects increased pollution would have on particular bodies of water. The commissioner issued permits and required comprehensive sewage surveys as various communities filed applications to extend existing sewer lines.[9]

In Pittsburgh, the first response to the 1905 act came from the Chamber of Commerce. The Chamber of Commerce appointed a special committee on municipal sanitation "to inquire into the subject of sewage disposal and other problems of municipal sanitation." [10] The

---

8 *Pennsylvania Legislative Record, 1905* (Harrisburg, 1905), 1659-60.

9 *Laws of Pennsylvania, 1905* (Harrisburg, 1905), 260-63 (hereafter cited as *Pa. Laws*).

10 Pittsburgh Chamber of Commerce, *Minutes of Transfer, March 10, 1902-July 27, 1907* (Pittsburgh, 1907), Jan. 10, 1907.

Municipal Sanitation Committee initiated its inquiry on March 7, 1907. Members of the committee included leading businessmen and engineers. The chairman, William Glyde Wilkins, and committeeman George M. Lehman were members of the Engineers' Society of Western Pennsylvania.

On October 10, 1907, the Municipal Sanitation Committee submitted a "Report On Sewage Disposal for Pittsburgh" to the Chamber of Commerce. Members of the committee reviewed available sewage-treatment technologies and sewage-disposal methods advocated by leading sanitary engineers. Their report outlined six alternative plans to solve Pittsburgh's sewage-treatment problem. Sewage-disposal systems utilized in a number of American cities served as models for these plans. In cities where polluted water supplies resulted from inadequate sewage treatment, sanitary engineers suggested either purification of sewage or improved sewer lines. Sewage-purification methods included intermittent filtration of sewage on natural or artificial sand beds, contact filtration in holding tanks, and trickling filtration which coupled settling tanks with dry-land application. For cities located away from large bodies of water, consulting engineers used individual septic tanks or sewage-farming techniques.[11] All of these alternative solutions emphasized the need to protect drinking-water supplies. Most sanitary engineers recommended sewage treatment only in those cities where water filtration proved ineffective in reducing the number of cases of typhoid and diphtheria.

After evaluating the available techniques and the arguments concerning sewage treatment, the committee urged city officials to employ a commission of competent sanitary engineers to investigate the problem and make specific recommendations. Committee members felt that while construction of a water-filtration plant would lower the typhoid death rate in Pittsburgh, typhoid fever would continue to threaten cities on the Ohio River. Typhoid-fever epidemics in these cities could easily spread to Pittsburgh. In addition, committee members argued that construction "of a sewage purification plant by Pittsburgh, will, to a degree, encourage the towns above us to do the same." [12] Sewage treatment by cities on the upper Allegheny River, the report continued, would help to cut Pittsburgh's water-filtration costs. Another argument in the report dealt with the local nuisance and health problems

11 Charles Zueblin, *American Municipal Progress* (New York, 1916), 97-100.
12 Pittsburgh Chamber of Commerce Municipal Sanitation Committee, *Sewage Disposal for Pittsburgh* (Pittsburgh, 1907), 28-29.

caused by inadequate sewer lines during periods of drought and flooding. Floods on the Monongahela and Allegheny rivers caused sewer lines to overflow and back up. During periods of low water, sewage collected on the river banks. Committee members felt that a sewage-treatment plant would provide year-round dependable service. Based on these conclusions, the committee called on city officials to act before the state Department of Health forced Pittsburgh to take action.

Officials in the Pittsburgh Department of Public Works responded to the 1905 act in their annual report for 1907. In outlining plans for sewer extensions, city engineers noted that Pittsburgh needed to construct separate sanitary sewers and a sewage-treatment plant in order to comply with the state law. Department officials recommended that city engineers begin a preliminary study to evaluate the costs and feasibility of separate sanitary sewers and sewage treatment. In early 1909, the Pittsburgh Department of Public Works filed an application with the state Department of Health to extend Saw Mill Run and Nine Mile Run sewer lines. Since these sewer lines discharged raw sewage into rivers used as drinking-water supplies, the permit application required approval by the commissioner of health. Dr. Samuel G. Dixon, commissioner of health, issued a permit on the condition that Pittsburgh conduct a complete sanitary survey and submit plans for separation of sewage and sewage treatment to the Department of Health by December 1, 1911. Thus, state action forced city officials to evaluate the problems caused by inadequate disposal and treatment of Pittsburgh's sewage.

Report Upon Sewage Disposal

On January 26, 1910, the Pittsburgh City Council appropriated $40,000 for a study of sewage treatment. The Bureau of Construction of the Department of Public Works proceeded to hire Allen Hazen and George C. Whipple, consulting engineers from New York City, to conduct the required sanitary survey. Hazen and Whipple inspected sewage-treatment plants in other cities and evaluated the status of Pittsburgh's facilities in light of the Department of Health's recommendations. Their study concentrated on the economic feasibility of constructing separate sanitary sewers and a sewage-treatment plant in Pittsburgh. Hazen and Whipple estimated the cost of building new sewer lines and a treatment plant. They also evaluated the intangible costs related to disruption of business. The cost of the proposed project was weighed against the benefits Pittsburgh would derive

from sewage treatment. These benefits included cleaner water for cities on the Ohio River and elimination of the local nuisances and health problems which resulted from faulty sewer outfalls. Based on the evidence collected during the two-year study, Hazen and Whipple concluded that "no radical change in the method of sewerage or of sewage disposal as now practiced by the City of Pittsburgh is now necessary or desirable."

Hazen and Whipple used a variety of interrelated arguments to support their conclusions. Their basic argument concerned the expenditures required for separating storm and sanitary sewers and constructing a sewage-treatment plant. Their *Report Upon Sewage Disposal* estimated that separation and treatment for a population of 800,000 would cost taxpayers $46 million. Sewage treatment for a projected population of 1.4 million residents would cost $73 million. Hazen and Whipple noted that city taxes would finance the entire project. In addition, homeowners and landlords would pay for additional sewer-line connections. Their report also mentioned the intangible costs which would result from disrupting business and blocking traffic. In discussing these costs, the engineers concluded that,

> no allowance has been made for losses from the suspension of traffic, and for losses of trade or other indirect losses which will grow out of having some of the principal business streets so far torn up as to be incapable of use for months, and of having sewer trenches dug in practically every street of the city.

Hazen and Whipple compared these expenditures with those required for water filtration. They noted that Pittsburgh's filtration plant cost taxpayers $7 million. Construction of the filtration plant represented an attempt to ensure pure water for local residents. Hazen and Whipple argued that the twenty-six towns on the Ohio River below Pittsburgh could provide filtered water for their 70,300 residents for less than $46 million. These towns spent between $2 and $3 million on water-filtration works during the nineteenth century and larger expenditures on their part, rather than Pittsburgh's, seemed the logical action.

The consulting engineers also noted that no precedent existed which required cities to treat sewage to protect downstream water supplies. They argued that as far as known, "there is no precedent for a city's replacing the combined system by a separate system [sewer lines] for the purpose of protecting water supplies of other cities" which take water from a commonly used river. The report concluded that even if Pittsburgh purified its sewage, the Ohio River would never

be clean enough to drink. Water supplies of Ohio River cities would always require filtration.[13]

The most interesting argument employed by Hazen and Whipple concerned the natural purifying action of the Ohio and Monongahela rivers. Based on a paper written by Thomas P. Roberts, they argued that acid-mine wastes when mixed with river water precipitated sewage. Roberts presented a paper entitled "Acids in the Monongahela River" to the Engineers' Society of Western Pennsylvania on October 17, 1911. In this paper, he maintained that acid wastes in the Monongahela mixed with sewage in the Ohio and lower Allegheny and precipitated this sewage before the Ohio reached the Davis Island Dam. Roberts based his conclusions on studies he conducted and on experiments made by the Pennsylvania Department of Health. Commissioner of Health Dixon conducted experiments using water samples from one mine and two leather tanneries in different parts of Pennsylvania. Dr. Dixon mixed these water samples with typhoid and colon bacilli to test the germicidal effects of mine and acid wastes.[14] According to the commissioner, his test results supported the conclusion that "the growth of the typhoid bacillus is prevented after exposure to mine water for one hour, and the growth of the colon bacillus materially limited after a somewhat longer time." Therefore, he continued, "the attempt to exclude mine water and spent tannery wastes from streams which may eventually become sources of drinking water would be a mistake." In concluding, Dr. Dixon noted that the acid condition of the Schuylkill River near Philadelphia "was an important factor in holding in check the prevalence of typhoid fever in that city." [15]

Hazen and Whipple used the Roberts paper and Dixon experiments to argue that "ample dilution," "efficient chemical precipitation," and "the large and increasing capacity of the Ohio River to take care of sewage and destroy . . . bacteria" provided adequate sewage treatment.[16] In their opinion, residents would benefit very little from sewage treatment. They noted that the increasing growth of technology and population made future planning impossible since a sewage-treatment plant built in 1912 would not serve residents of future

13 The material on the report is from Allen Hazen and George C. Whipple, *Report Upon Sewage Disposal, 1912* (Pittsburgh, 1912), 1-55.

14 Thomas Flemming, Jr., "Germicidal Effects of Mine Water and Tannery Wastes," *Engineering Record* 61, no. 1 (Apr. 16, 1910) : 533-34.

15 Ibid., 534.

16 Hazen and Whipple, 70.

generations. If population increased dramatically and sewage odors became a health hazard, the city could construct settling tanks at sewage outfalls.

Hazen and Whipple recommended that the city alleviate the nuisances and odors which resulted from either damaged sewer outfalls or low-water levels by constructing storage reservoirs on the Monongahela and Allegheny rivers. Storage reservoirs built in Johnstown, Pennsylvania, enabled that city to control flooding, protect its water supply, and flush sewage downstream during periods of low water. If Pittsburgh followed this example, reservoir flushing would "improve the water supply conditions and it would push the local nuisance problem in the rivers into the future for at least a generation, and perhaps a longer period." [17] At the same time, the Hazen and Whipple report continued, controlled flooding would scour the river bottoms and clean out precipitated sewage.

Hazen and Whipple submitted their *Report Upon Sewage Disposal* to Frederick P. Stearns and Harrison P. Eddy, consulting engineers from Boston, for confirmation and comments. Stearns and Eddy reviewed the conclusions outlined in the report and added that sewage treatment in Pittsburgh would not substantially reduce water-filtration costs for Ohio River communities.

Reactions to Report

The Hazen and Whipple study defined the public-health problems caused by inadequate sewage disposal and treatment in Pittsburgh. The study also outlined a number of alternative solutions to these problems. Hazen and Whipple concluded that Pittsburgh simply improve its sewer lines and urged construction of storage reservoirs. However, if city officials favored sewage treatment, the report offered two estimates for constructing separate sanitary sewers and a sewage-treatment plant. Other alternative solutions discussed in the report included constructing settling tanks at sewer outfalls, building storage reservoirs, and encouraging cities on the Ohio River to filter their drinking water.

On January 30, 1912, Norman S. Sprague, superintendent of the Department of Public Works, received the *Report Upon Sewage Disposal.* After reviewing it, Sprague submitted the report to Mayor William A. Magee. Magee accepted the consulting engineers' recommendations and suggested that the city provide filtered water for all

17 Ibid., 46.

residents and abate sewage pollution above the Aspinwall Water Works. These actions, he felt, would not only help alleviate the local health problems but also satisfy the state Department of Health.[18] On February 13, 1912, Mayor Magee submitted the report to the city council, as reported in the *Municipal Record* for that day. He called on the council to "give immediate consideration to these reports and recommendations in order that the policy of the City may be definitely determined and communicated to the Commissioner of Health at a very early day."

The city council referred the report to the Committee on Public Works. This committee recommended that the mayor be permitted to transmit the report to the commissioner of health. The committee also resolved on March 12 that the,

> City of Pittsburgh is unable to immediately decide upon a policy with reference to the collection and disposal of its sewage upon the comprehensive plan desired by the State Department of Health.

The city council adopted the committee's resolution and submitted it, along with the report, to Dr. Dixon.

The 1905 act placed the commissioner of health in a difficult position. While the law required cities which polluted state waterways to construct sewage-treatment facilities, Dr. Dixon understood that Pittsburgh and other cities could not afford sewage treatment. The Pennsylvania Constitution limited the bonding power of cities to 7 percent of their assessed valuation. In the case of Pittsburgh, the costs of sewage treatment exceeded this debt limit. Dixon also realized that many cities constructed water-filtration plants in an attempt to resolve local public-health problems. For these cities, sewage treatment seemed unnecessary.

On March 28, 1912, Dr. Dixon responded to the *Report Upon Sewage Disposal.* Dixon noted that Pittsburgh officials misunderstood his instructions. The commissioner wanted Pittsburgh engineers to propose a comprehensive, economically feasible sewerage plan for the city. Instead, Hazen and Whipple rejected sewage treatment as an alternative and offered no long-range solutions. Thus, the report failed to meet with Dixon's approval. It also failed to resolve the sewage and public-health problems which affected residents on the Monongahela, lower Allegheny, and Ohio rivers.

The city council referred Dixon's reply to the report to the Com-

---

18 *Pittsburgh Executive Department Annual Report, 1911-1912* (Pittsburgh, 1912), 38-39.

mittee on Public Works. In the *Municipal Record* of May 21, 1912, Councilman Robert Garland "resolved that all further investigations in relation to the disposal of sewage shall be suspended until such time as Council shall direct its resumption." Thus, by accepting the conclusions of the report, city council ignored the recommendations of the local Chamber of Commerce and state Department of Health. In the 1913 annual report of the Department of Public Works, Superintendent Sprague noted that neither Pittsburgh nor Dixon had taken any further action regarding the sewage problem. Pittsburgh, along with 124 other cities, received discharge permits from the state Department of Health.[19]

Dixon temporarily resolved Pittsburgh's sewage problem by issuing the discharge permit. However, the commissioner also wanted city engineers to develop a comprehensive disposal and treatment plan for the city. Since city officials accepted the conclusion that sewage treatment was unnecessary, no comprehensive plan emerged. Rather, Pittsburgh continued to apply for discharge permits from the state commissioner of health until 1939.[20]

While local officials and officials of the Pennsylvania Department of Health responded to the *Report Upon Sewage Disposal,* members of the Municipal Sanitation Committee of the Chamber of Commerce developed a revised sewage-disposal plan. Their revised plan differed from the report issued by the Chamber of Commerce in October 1907 in two respects. First of all, the new program recognized the need for state and federal cooperation and financial assistance. Since committee members realized that Pittsburgh required financial aid in order to comply with state regulations, the Municipal Sanitation Committee urged the state government "to enter into contracts with Cities, Boroughs, and Counties for the erection of Sewage Disposal plants, whereby the State shall defray a portion of the cost." [21] If the state or federal government failed to provide the necessary assistance, then committee members offered an alternative to the sewage-treatment plan outlined in their 1907 report. Based on recommendations made by the Pittsburgh Flood Commission and leading sanitary engineers, the committee proposed the use of storage reservoirs to alleviate the sewage-disposal problem. The use of reservoirs, the committee noted, would

19 *Pa. Health Reports, 1913,* 8: 901-2.
20 Allegheny County Sanitary Authority, *Report* (Pittsburgh, 1948), 1.
21 Pittsburgh Chamber of Commerce Committee on Legislation, *Legal Questions in Connection with Sewage Disposal for Pittsburgh* (Pittsburgh, 1907), 4.

ensure a steady flow of water in the three rivers and simplify sewage-disposal problems for Pittsburgh and cities on the Ohio River.[22]

In a report issued on August 16, 1912, the Pittsburgh Flood Commission advocated the construction of storage reservoirs as one way to resolve Pittsburgh's sewage-disposal problems. Members of the Municipal Sanitation Committee and leading sanitary engineers supported the Flood Commission's recommendations. Morris Knowles, a member of the Municipal Sanitation Committee and chairman of the Flood Commission's sewage-disposal committee, argued that sewage disposal by dilution represented a feasible sewerage method for Pittsburgh. Knowles labeled medical officers and engineers who called for complete sewage treatment, regardless of cost, extremists.[23] Construction of storage reservoirs on the Allegheny and Monongahela rivers, he maintained, would provide the water necessary for dilution of Pittsburgh's sewage.

Other prominent sanitary engineers defended the concept of "disposal by dilution." Some favored diverting sewage through screens or settling tanks before discharging it into bodies of water. Others recommended that states allow only those cities with filtered drinking water to discharge raw sewage. George W. Fuller, a consulting engineer from New York City, after examining sewerage systems in cities in the United States and Europe, concluded that:

> to insist upon sewage purification to a high degree for each community in a valley before insisting upon the correction of polluted water supplies seems to be folly. The broad sanitary requirements of communities should be carefully considered and money spent in a way that will produce the most good.[24]

George C. Whipple, coauthor of the *Report Upon Sewage Disposal,* also defended the argument that sewage treatment should follow water filtration. Whipple noted that "the question has been raised in a number of places as to whether it is better to purify sewage of an upper city on some river or to filter the water of a lower city." [25] In practice, he continued, "it is generally much cheaper to filter water below than it is to purify the sewage above, and it is also more efficient." In most cities, Whipple maintained, "greater economy can be secured by aban-

---

22 Pittsburgh Chamber of Commerce, *Annual Report, 1912* (Pittsburgh, 1912), 37.

23 Morris Knowles, "Keeping Boundary Waters Clean," *The Survey* 33 (Dec. 19, 1914) : 313-14.

24 George W. Fuller, "The Problem of Sewage Disposal," *The American City* 5 (Dec. 1911) : 343-45.

25 George C. Whipple, *Typhoid Fever, Its Causation, Transmission and Prevention* (New York, 1908), 265.

doning water supplies from polluted streams than by attempting to reduce pollution to the required extent." [26]

Fuller, Knowles, Whipple, and other sanitary engineers agreed that the high costs of sewage treatment would force cities to find alternative ways to obtain clean water. These engineers favored the use of storage reservoirs and water filtration as the most effective way to provide pure drinking water. When Hazen and Whipple applied this principle to Pittsburgh, they concluded that economy dictated the cities on the Ohio River either filter their water supplies or find nonpolluted sources of water. In either case, based on the available technology and local economic conditions, they felt that Pittsburgh should not be required to treat its sewage until these cities filtered their water.

In view of the arguments presented by sanitary engineers and committee members, the Municipal Sanitation Committee accepted the recommendations outlined in the *Report Upon Sewage Disposal* and the Flood Commission report. The final sewage disposal plan issued by the Chamber of Commerce included the construction of storage reservoirs and disposal by dilution. This plan, in sharp contrast to the report issued in October 1907, signalled a defeat for supporters of sewage treatment.

Conclusion

A number of factors contributed to Pittsburgh's acceptance of the *Report Upon Sewage Disposal,* which supported disposal by dilution. The most important factor concerned the economic feasibility of sewage treatment. Since Pittsburgh taxpayers spent $7 million for the Aspinwall Water Works, city sanitary engineers, local officials, and civic leaders saw no need to spend between $37 and $46 million to purify Pittsburgh's sewage. In turn, the cost of the sewage treatment required by the state Department of Health exceeded Pittsburgh's debt limit. If cities on the Ohio River wanted clean drinking water, local engineers recommended that they invest in water-filtration systems rather than demand sewage treatment in Pittsburgh.

The decrease in the number of deaths from typhoid fever and diphtheria which resulted from filtered drinking water also influenced Pittsburgh's decision regarding sewage treatment. Since water filtration lowered typhoid deaths in Pittsburgh, consulting engineers maintained that sewage treatment was unnecessary. Rather, these engineers

26 George C. Whipple, "Standards of Purity for Rivers and Waterways," *The American City* 7 (Dec. 1912) : 559-61.

recommended that Pittsburgh construct storage reservoirs and improve sewer outfalls to solve local nuisance and health problems. Leading sanitary experts argued that sewage disposal by dilution would work in rivers saturated with iron and acid wastes. Since Pittsburgh's rivers contained large amounts of iron and acid wastes, improved sewer outfalls and storage reservoirs would help to facilitate disposal by dilution. In turn, storage reservoirs would help to solve nuisance and health problems which resulted during periods of flooding and low water on the three rivers.

Reliance on the testimony of experts in sanitation and sewerage systems also played an important role in the decision-making process. City public-works officials and civic leaders represented the upper classes of Pittsburgh and supported the concept of efficient, economy-oriented decision making in government.[27] The sanitary experts employed by Pittsburgh and local sanitary engineers, who played a role in the final decision, also based their arguments on the need for a well-ordered, efficient city government. According to these experts, efficiency and economy dictated that Pittsburgh forego sewage treatment. Hazen, Whipple, Knowles, and other consulting engineers also dismissed arguments based on Pittsburgh's role as a good neighbor and obligations to cities on the Ohio River. In terms of Pittsburgh's limited resources, problems such as smoke control, inadequate housing, flood control, and corruption in government seemed more important to civic leaders than sewage treatment.[28] Since improved sewer outfalls and storage reservoirs would provide an adequate short-term solution to local problems, city officials and civic leaders accepted the Hazen and Whipple study.

Pittsburgh continued to discharge untreated sewage into the three rivers until May 1959. In 1937, Governor George H. Earle signed a law which repealed sections of the 1905 act.[29] This repeal ended all local efforts to construct sewage-treatment facilities until 1939, when pressure from cities on the Ohio River forced city, county, and federal agencies to conduct another comprehensive sanitary survey. Engineers from the Works Progress Administration and Civil Works Administration, led by John E. Koruzo, completed the survey in 1940 and rec-

27 Morris Knowles, William Glyde Wilkins, and George H. Lehman were listed in the *Pittsburgh Bluebook* and *Prominent Families of Pittsburgh, 1912.* Norman Sprague and Joseph Armstrong, Department of Public Works officials, also represented the elite classes in Pittsburgh.

28 J. T. Holdsworth, *Economic Survey of Pittsburgh* (Pittsburgh, 1912), 6.

29 *Pa. Laws, 1937,* 2003.

ommended that Pittsburgh and eighty-eight municipalities in Allegheny County construct intercepting sewers and nineteen sewage-treatment plants at a total cost of $38.5 million. The Koruzo report represented the first attempt at comprehensive, long-range planning for sewage treatment in Allegheny County. From 1940 to 1945, city and county officials debated the advantages and disadvantages of the Koruzo report but failed to take any action.

On May 8, 1945, Governor Edward Martin signed a law which forced Allegheny County officials to prepare another county-wide plan for sewage treatment and disposal.[30] Pittsburgh and 101 other municipalities in Allegheny County received orders "to stop polluting the streams of the State and to proceed with the preparation of plans . . . to accomplish this." [31] On March 12, 1946, 71 municipalities joined Pittsburgh and formed the Allegheny County Sanitary Authority (ALCOSAN) to solve the problem of sewage treatment and disposal on a county-wide basis. ALCOSAN officials, led by executive director and chief engineer, John F. Laboon, recommended construction of seventy miles of intercepting sewers and a sewage-treatment plant near the north end of the McKees Rocks Bridge at a total cost of $100 million.[32] Grants from twenty-three area banks and federal, state, and local agencies financed construction of the county sewerage system. When the sewage-treatment plant started operations in May 1959, ALCOSAN started collecting sewage taxes from 1.4 million residents and nineteen industries to repay building costs.

Thus, by 1945, state enforcement of pollution-abatement legislation required Pittsburgh officials and civic leaders to join with other municipalities in Allegheny County to resolve the problem of sewage treatment. Pressure from cities on the Ohio River and actions taken by other cities in Pennsylvania to resolve sewage-treatment problems forced state officials to implement this legislation. This state action resulted in the comprehensive, long-range sewage-treatment program which Pittsburgh officials refused to develop in 1912.

---

30 Ibid., 1945, 435-43.

31 Allegheny County Sanitary Authority, *Report* (Pittsburgh, 1948), 4.

32 "Pittsburgh Digs Deep for Cleaner Streams," *Greater Pittsburgh* (Aug. 1957), 11-13.