

Obstacles to Infrastructure Provision: The Struggle to Build Comprehensive Sewer Works in Baltimore

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“It is a 2000-horse-power smell that lays limburger cheese in the shade,” proclaimed an editor on the stench of Baltimore’s harbor during the heat of summer in 1897.¹ Such commentaries became increasingly frequent in Baltimore’s newspapers as the nineteenth century drew to a close. Remarkably, in 1900, this city of a half million people did not have a comprehensive sewage system, making Baltimore one of the last cities of its size to hold that dubious distinction. Cesspits and privies, not designed to handle modern plumbing equipment, overflowed into the Jones Falls and other channels of the city. Open gutters carried street wastes into the stagnant waters of the harbor where it mixed with household sewage. Until the 1910s, Baltimore remained a city of open gutters, a source of embarrassment and consternation to most of the city’s leaders and elite. Municipal government did not ignore the question of sewers; the city council appointed and paid for sewerage commissions in the 1850s, 1880s, and 1890s—commissions that invested considerable time and effort reviewing sewer technologies in Europe and North America—producing working plans for Baltimore, but the city was unable or unwilling to implement them. Only in 1905 did the city finally begin to build comprehensive sewers.

Baltimore’s case is peculiar in the amount of time it took to pass a referendum to build sewers, but the case also demonstrates some common characteristics of the evolution of infrastructure provision in North American cities. Prior to the Civil War, few municipalities built or financed large-scale public works.² Long considered the domain of entrepreneurs, urban services such as water, roads, and transportation only slowly folded into the purview of the municipality. In the case of sewers, few but the wealthy were willing to pay for the underground conduits to carry away wastewater and human waste. Sewers served as a convenience to customers but did little if nothing at all to improve conditions in the city.

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Since sewers usually emptied into streams and collected into stagnant pools in depressions, even the well-to-do could not escape the stench or disease that accompanied improper waste removal. Because the early systems were not integrated, all urban dwellers suffered, especially those at lower elevations.³ Municipal officials and the public recognized the value of comprehensive urban drainage works, but municipalities did not take responsibility for building and operating sewers until the latter half of the nineteenth century.⁴

The shift from private to public services coincided with changes in the structure of municipal government.⁵ Nineteenth-century municipalities were typically weak creatures of the state, with limited legislative and economic powers. Borrowing privileges and allowable debt were restricted, making it difficult for municipalities to raise the large sums of money necessary to build and operate essential services. Referenda on major expenditures tied the hands of municipalities to popular will, influenced strongly by a private sector that often opposed municipal ownership. It was simply easier for cities to leave urban services to private corporations that had the ability to raise money, as well as the staff and expertise. Municipal governments maintained a minimum level of control by regulating franchises, but widespread abuses of franchises were common. A pervasive culture of privatism and individualism further undermined the ability of cities to build grand projects, even if they were able to scrounge up the funds. Unease about government control of what citizens considered private property concerns discouraged city councils from developing public works.⁶

Tensions between the private individual and the public good are long standing in Western society. Miles Ogborn's fascinating study of paving in eighteenth-century London illustrates the difficulties incumbent with the development of "a public" cobbled together from private interests to finance, construct, and administer street paving. He argues convincingly that paving was more than an exercise in organization or the implementation of new technology. Paving the streets of Westminster depended on important philosophical underpinnings (as expressed for example in the writings of David Hume) that supported a public that incorporated the ideals of the private.⁷ Experience in the North American city demonstrates the continued tug of war between the public and private, a battle that has encouraged and discouraged the development of public works at various times.⁸ In the first half of the nineteenth century, private initiatives held the upper hand.

By the second half of the nineteenth century, municipalities were more apt to engage in public works. As cities increased in size and population relative to the countryside and economies shifted from rural to urban, municipalities demanded new charters from state government that increased their ability to borrow money and control services. Increasing economic dominance of cities over the course of the nineteenth and early twentieth centuries meant that municipalities could demand greater economic and political autonomy from the state. Economic growth also meant higher revenues and better borrowing rates for cities. Assessments and

taxes brought increasingly larger funds into municipal coffers, which city governments used to purchase private franchises and to finance new city services.⁹ The timing of new undertakings was tied closely to economic cycles, or booms and busts. Cities tended to expand their services during the booms and then scramble to keep them going during the downturns. Public approval of municipal services was easier to achieve during upturns than declines.¹⁰

Private companies gravitated to services that were most profitable, and where user measurements were straightforward. Transportation, water, and electricity services were easily measured and, in many instances, generally profitable. Sewerage and street use were more difficult to measure, and were, more often than not, paid for by assessments on abutting properties, or in the case of sewerage, by a flat fee. For private companies to profit from laying main sewer lines, they had to get customers to link up to the main line. More people saw the benefit of running water—a real labor saver—compared to sewers and were more likely to pay for water than for a sewage hookup.¹¹ In the minds of most nineteenth-century city dwellers, cesspits worked just fine.

Vested interests in the old privy vault technology further discouraged the adoption of sewers. For centuries, local entrepreneurs profited from emptying and removing the solid contents, or “nightsoil,” of privy vaults and cesspits. Nightsoil removers made money in two ways—from the fee charged to the homeowner, and from the sale of the nightsoil as fertilizer to farmers. The city usually collected a license fee and sometimes operated fertilizer plants for added revenue. For many, the idea of flushing away something that brought employment and revenue was mystifying. Minds changed with the introduction of piped water and water closets into homes. By the 1890s, the noted sanitary engineer George Waring had declared for New York City that the small amount of human waste mixed with high amounts of water made it too diluted to process as fertilizer.¹² More to the point for homeowners, the privy vaults and cesspits began to overflow, leaving stinking pools in their back yards.

Compounding the problem for sewer construction was the belief that sewer gas, from poorly engineered sewer systems that drained slowly and did not adequately flush wastes, was a major threat to human health.¹³ Urban dwellers were more likely to complain of unclean water, or dirty and poorly lit streets, than inadequate drainage. Not until public health officials convinced homeowners that leaking cesspits and privies could threaten their own health and lives did they agree to pay for sewers. Adoption of the sanitary idea in the 1850s and germ theory after 1880 were critical milestones in efforts to build sewers.¹⁴ Public-health scares tended to move decision makers to act.¹⁵ The cholera and typhoid epidemics of the nineteenth century inevitably resulted in meetings and commissions to discuss solutions to environmental problems in the city. Miasmatic theory, that rotting vegetable matter and bad odors were responsible for

disease, prevailed through most of the century and although the theory was unfounded, the efforts to improve sanitation ameliorated public health overall. By the latter half of the nineteenth century, germ theory was more widely accepted, showing the direct connection between polluted water and disease. Public health agencies in the United States and Europe used this as a justification for comprehensive sewer works. The arguments that only a *comprehensive* sewer system could improve public health carried considerable weight in public opinion and eventually that of the decision makers. Fear for their lives and that of their children was a powerful imperative.¹⁶

Growth of a professional bureaucracy, especially engineering, was a key ingredient in the development of publicly owned and operated services. Though not entirely divorced from petty politics and favor trading, the professional staff strove towards efficiency, based on scientific principles rather than political gain.¹⁷ With minimal government interference, municipal engineers were increasingly able to operate more like a private enterprise. An important difference between the engineers and the private corporations was that the municipal employees had the interest of the public, rather than the shareholder, in mind.¹⁸ Expansion of public agencies less influenced by politics was part and parcel of the transition from *laissez-faire* politics to progressive and reform politics that characterized the late-nineteenth and early twentieth century city.¹⁹ Still, impacts of progressive era reforms are often overstated. Private interests continued to hold sway in many decision-making forums and profit from those decisions. Petitions for public infrastructure often came from industry and other business leaders when the benefits to the private sector were clear. It was not uncommon for business elites to call for improved services because it would improve the climate for commerce. Sewers increased real estate values, attracted commerce, and protected industry from legal challenges for nuisances, all at the cost to the public purse raised from assessments and taxes on all residents. Despite the inevitable imposition of taxes and fees that would follow, by the second half of the nineteenth century, property owners frequently petitioned city leaders to construct comprehensive sewer works.²⁰

Increasing population densities necessitated changes in wastewater removal, but industrial growth brought increased incentives as well. As cities industrialized, few land-use controls existed. Industry and residences were sometimes built next to each other, drawing complaints and, at times, lawsuits and court cases. The stench and discharges from factories and commercial establishments drew fire from the public and also from other industry. By discharging the offending matter in pipes underground, industry could avoid some of the public protest. Calls for wastewater infrastructure tended to coincide with crises, or extraordinary disturbances to everyday life. While nineteenth-century cities were notoriously smelly, big stinks in particular years tended to increase petitions for results.²¹ There were limits to what the public could tolerate. At some point, clogged

drains, floods, and standing water (often mixed with human and household waste) spurned action, or at least talk. In Baltimore, when winters were especially cold, alleyways, which also acted as gutters and drains for wastewater and storm runoff, would become impassable. Such frustrations and calls to fix the problem filled the newspapers' editorial pages and council minutes.

Finally, the decision to build wastewater infrastructure coincided with cultural change, specifically regarding bodily functions and cleanliness. In Paris, changing conceptions of human waste, from something associated with the smells and fertility of rural life to something associated with decay and physical repulsion, created strong demand for sewers and scientific management of sewage.²² In North America, new sensibilities regarding cleanliness created strong demand for piped water and a means to whisk wastewater away. In part this was a product of new health theories, but it was also a sea change in what was considered to be proper behavior of cleanliness and domesticity. Once banished to the outside of the home for fear of sewer gas, Americans began to expect to perform their physical duties within the home, provided they had flush toilets and a sanitary means of removing the waste.²³

Modernity dictated different norms of individual and collective behavior. By the end of the nineteenth century, most Baltimoreans, similar to other city dwellers in the western world, were sold on the idea of flush toilets and even paying for sewers. Equally, city government and other institutions recognized the value of a modern sewer system, but state restrictions stymied the municipality in its efforts to build what the majority wanted. The great fire of 1904, which destroyed much of downtown Baltimore, was a critical catalyst for change, but there was a great deal of pent-up demand for a modern sewage system when the crisis occurred. Public health officials, municipal engineers, the business community, and ridicule from other cities had convinced Baltimoreans of the importance of sewers to the city's health and economic vitality. Resolving conflicts within the city council and between the city, surrounding counties, and the state was difficult. The end result was an extraordinary delay in building sewers, and in Baltimore's transition to a modern city.

The Big Stink

At the end of the nineteenth century, Baltimoreans opened newspapers with a certain degree of dread. The city was one of the last of its size without modern sewers and stories such as this one from the *Washington Post* reminded them of that deficiency:

A large percentage of the annual death roll of Baltimore is directly chargeable to bad drainage. No other American city of equal or approximate population and wealth is so badly situated in this re-

spect. Why a community so enterprising and progressive as the Baltimoreans have proven themselves to be have so long neglected to construct sewers; why they have postponed, year after year, to do what they knew must be done; why they have endured the almost intolerable stench of Jones' Falls—all this is a mystery to the explanation of which it were vain to devote time or space.²⁴

More than 20,000 cesspits were draining illegally into Jones' Falls. Even the newly built City Hall was illegally dumping its sewage into the river. Plumbing laws passed in the 1880s mandated that all new construction include bathrooms, but sewage was permitted to spill into gutters.²⁵ New plumbing facilities increased water usage and pumped more sewage into the city's streets and alleys, and overflowed privy vaults and cesspits.

Sewage eventually made its way into the harbor. Here Baltimore welcomed ships and people from around the world. The harbor was the economic heart of the city and region; it was also quite literally Baltimore's toilet, receiving household and industrial sewage and anything that washed from the territory occupied by a half million people. The harbor's stench was a frequent subject in the newspapers. An editor of the *Baltimore Sun* captured in colorful language its dreadful state:

The water of the basin is simply filthy, and instead of being clear water is an opaque body of sewerage. It can be smelled blocks away when stirred up by the constantly moving steamers. The passengers on the excursion steamers get the full benefit of this stench, and those who have been down the bay previously this season, carry handkerchiefs well saturated with cologne which they hold to their noses from the time they leave Light-street wharf until they get outside the harbor. . . . In addition to the smell of decayed matter there is a sort of "extract de gas house" odor as a sort of side attraction, which is all powerful. It takes a few seconds for this special "ozone" to get well settled in the nostrils, but when it is once there it is guaranteed to last 24 hours.²⁶

Given prevailing miasmatic theory and the harbor's typical stench in the summer months, the city occasionally cleaned decaying materials from the harbor surface in hopes of preventing disease. In the summer of 1897, the harbor cleaner hauled out 272 cartloads of material, with some surprising contents: "8 cartloads of dead alewives, 2 monkeys, 174 dogs, 238 cats, 1,722 rats, 257 chickens, 631 chunks of meat, 324 crabs, 1,096 pineapples, 36 bunches of fish, 12 sea turtles, 10 ducks, 3 large drum fish, 5 pigeons, 4 geese, 2 sparrows, 2 rock fish, 1 calf."²⁷ The refuse of the city (and from trading ships) deposited in the stagnant harbor was a source of embarrassment and concern for Baltimore's public-health leaders. The Board of Health made frequent reports on the state of the basin, and suggested several methods to "disinfect" the harbor, but argued that little

could be done to reduce the stench and sight of the harbor without a proper sewer system.²⁸

Sewerage Commissions, Oysters, and Public Health

High mortality rates, putrid water, and horrible stenchs did not go unnoticed by Baltimoreans, but doing something about them proved to be difficult. The city appointed commissions in the 1850s and the 1880s to come up with a plan for sewers but did not carry out their recommendations to build a comprehensive system. In both cases, the cost of municipal ownership was deemed too onerous. When the city council returned to the issue of sewers in the 1890s, Republican council members argued that a private corporation should build and operate the sewers. The commission was aware that a comprehensive and separate sewerage system (storm and sanitary sewers) would be costly. The consulting engineers favored a plan to filter domestic sewage through sandy soils in adjacent Anne Arundel County, but the commission decided for cost reasons to adopt a plan that would send untreated sewage from North Point into the Chesapeake Bay. The commission estimated the total cost of the sewerage plan to be \$10.5 million by the time all houses received connectors to the sewers, which it projected would happen by 1925. Initial costs for construction would be in the order of \$6.1 million over five years. The Anne Arundel plan would cost about twice that for construction and was estimated to cost three times more to operate than dumping sewage into the Chesapeake. To pay for the sewers, the commission suggested a classic nineteenth-century method—make the user pay. Although the city would float bonds to pay for the construction, an annual sewer fee of \$4.20 for households with hookups would pay down the debt in an estimated 50 years while paying for annual system maintenance.²⁹

The plan to dump sewage into the Chesapeake was attacked on two fronts—from the oyster business and the public health community. Consulting engineers supported the Anne Arundel plan partly because they believed dumping untreated sewage into the bay would harm the oyster beds. Figures from 1880 show the oyster business in Maryland was substantial. In that year, oystermen pulled 10.6 million bushels of oysters from Maryland waters, employing 24,000 people. Most of the oysters were processed in Maryland; in 1880, 7.7 million bushels valued at \$4 million were packed by 6,200 men and 2,500 women in a total of 98 firms. Baltimore held the distinction of packing more oysters than any other city in the world. In 1880, nearly 10,000 vessels brought 7.2 million bushels to the city's 48 packing houses.³⁰ Any initiative that might endanger the oyster trade was bound to meet staunch resistance.

While the commission recognized the importance of the oyster business to Maryland's economy, building an affordable sewer system was its top priority. It cited evidence from other cities in the Chesapeake and

along the east coast where sewage was dumped and oyster harvests or human health were not apparently affected: "in the Chesapeake Bay, where the dispersion of sewage will take place in an immense body of water in constant movement under the influence of winds, tides and fluvial currents, there need be no apprehension of evil, either to the oysters or to those who use them."³¹ The Oyster Commission Merchants of Baltimore did not favor the Chesapeake Bay plan, arguing that regardless of the impacts of the sewage on the oyster beds, the knowledge alone that domestic sewage was being dumped near the beds would be harmful to its oyster markets. If customers knew that Baltimore sewage was mixing with Chesapeake Bay oysters, it would simply be bad for business.³²

Public health advocates questioned the plan to dump untreated sewage into the bay. Soon after the report's release, the Maryland Public Health Association met in Baltimore to hear the latest on public health science. One session was devoted specifically to "The Sewerage of Baltimore." It was the expressed purpose of the association, in its first meeting ever, to "stir up a public sentiment that shall demand a better system of sewerage that [sic] is now in use, or rather that is lacking altogether in the city."³³ The association invited the public to attend. One professor from Johns Hopkins University presented a paper stating that dumping sewage into the Chesapeake would harm the oyster beds and also be a breeding ground for typhoid. In a unanimous decision, the association voted to support the filtration method in Anne Arundel County, even given the higher costs.³⁴

Public Pressure for Filtration

Public outcry forced the city council to reconsider its support for the commission's recommendation to dump untreated sewage into the Chesapeake. The council convened a special commission on sewerage in December 1897 and the following January filed a report in favor of the filtration system. Two of the members did not believe that dumping into the Chesapeake would hurt the oyster beds or pose a threat to human health but voted in favor of the filtration system because of the "public prejudice against the plan."³⁵ In the meantime, the new city charter of 1898 created a revamped health department that held the Health Commissioner responsible for the city's sanitary conditions. It also authorized the commissioner to appoint sanitary inspectors, one of whom had to be trained in the "science of drainage." In the minds of the state and city leaders, the connection between public health and sewerage was clear.

The question of what to do with Baltimore's sewage, however, was far from over and debates and delays repeated the typical pattern of doing nothing about the problem. The newspapers continued to report on backed up sewage and foul odors, the filth and stench of the harbor, and, owing to poor drainage, streets and alleys blocked by ice during winter. While there was general agreement in the city that a sewerage system was needed,

groups battled over who should pay for it, who should govern it, and which plan of disposal should be used. In the middle of the gridlock, another proposal from a private company was put before the council. The Maryland Construction and Contracting Company caught the city council and sewerage commission off guard in July of 1899 with an offer to finance and construct the city sewers, agreeing to leave the operation to the city. The company's charter gave it the right to construct infrastructure anywhere in the state, ostensibly surviving an attempt by the state legislature to restrict the company to sewer building in western Maryland. No further legislation would be necessary for the construction to begin while the city on its own would need an enabling act from the General Assembly if it wished to build the sewer system. The only requirement would be an act of the city council and approval of the contract from the Board of Estimates. Raising the \$10 million necessary for the works would not be difficult according to the company's spokesperson. Making it even more appealing was the company's willingness to allow the city to operate the sewer system and the option to purchase it at any time. For supporters of the sewerage system, it was an attractive offer. The private enterprise would have no difficulty in raising the funds, would not require an act from the General Assembly, would be able to build it using cheaper labor (city contract required the eight-hour day and higher wages), and would allow the city to control its operations.³⁶ The carrot of a privately built infrastructure was again swung before Baltimore's leaders and citizens.

Opposition to the plan came swiftly. Baltimoreans had witnessed the effects of privately owned infrastructure, such as the streetcar franchises, where profit motives meant poor service and high fees. The sewerage commission, having considered private ownership in its deliberations, staunchly opposed the idea. This decision echoed that of other municipalities around the country, which generally rejected private sewer ownership. New Orleans had allowed a private company to build sewers, but in 1898, after the company failed to complete the works and the city suffered a yellow fever attack, suspended the company's contract and built a municipal system.³⁷ Some city councilors suggested that the corporation was working to prod the city council into passing an enabling act: "It is stated that one object of the promoters of the enterprise is to influence the city to take up the matter of having a sewer system constructed, even though it is not done by this company. It is thought that agitation of the subject by this company will tend to awaken the public to the necessity of the work."³⁸ Using a "paper" company to force the hand of municipalities to build public infrastructure was a common ploy in cities across North America.³⁹

A procedural mistake brought the issue of a private sewer to an abrupt end. News of the proposal made its way to Annapolis where senators who had passed the Maryland Construction and Contracting Company Act responded that the bill had been amended, restricting the company to three counties in western Maryland. The amendments were read and passed

in the senate, but somehow did not make it into the written act. The following day, red-faced directors of the company (who had purchased the franchise from the original owners) issued a statement that they would not pursue the proposal, even though the text as written could hold in court.⁴⁰ This comedy of errors was not the last attempt to privatize the sewage system; another would follow at a time of crisis.

The sewerage question died down over the following year, despite reports that many of the large buildings downtown were getting sewerage for free by dumping sewage into the storm drains. It was not until the health commissioner published a report on the need for sewerage to improve Baltimore's public health and image that the city took up the issue again. "If Baltimore is to take its place among the great cities of the country, if it is to be classed as something else than a village," wrote the Health Commissioner, "the uncleanliness and unhealthful conditions which now surround us must be done away with."⁴¹ One of the reasons Baltimore had gone so long without a sewage system, he argued, was the city's topography. Unlike Chicago, which sat on relatively flat land, Baltimore was well and naturally drained into the Patapsco River. If Baltimore had similar topography to Chicago, he stated, the sewage problem "would long ago have been intolerable."⁴² Well-drained sandy soils underneath most of the city also made cesspools reasonably effective. But the natural advantages of topography and soils could remedy the city's drainage only for so long. Increased water use in the 1880s began to exceed the capacity of cesspools and drainage systems. Although city codes forced the construction of bathrooms and water closets in new homes, it did not require sewers to carry away the sewage. Most toilets emptied into existing cesspools, but the increased quantities of water resulted in the overflowing of cesspools into the streets and alleys of the city.⁴³

The report seemed to have an effect on Mayor Hayes, a Republican who, when elected two years prior, had opposed a new sewage system as too costly. Over the next year, his sentiments began to change and he devoted much of his energies to having a sewage bill passed in the General Assembly. The task was onerous, given the long tradition of uneasy politics between Baltimore and the legislature in Annapolis. Baltimore needed approval from the state legislature to borrow the large sum of money necessary for the works, and getting that approval meant appeasing the areas outside the city.⁴⁴ Although the Democrats had a majority in the senate, house, and city council, representatives from surrounding counties had to keep in mind the heated cries of their constituents. Senator Kirwan, a Democrat from Queen Anne's County, opposed the original sewerage because Baltimore's sewage would end up on the shores and oyster beds of his home county. With support from the mayor, the sewerage commission had proposed to dump the sewage into the Chesapeake Bay. The commission appeared before the Senate in Annapolis and argued that dumping the sewage would not harm the oyster industry or residents liv-

ing nearby. Republicans on the city council had longed used the “oyster card” to oppose publicly financed sewer plans and managed to convince Republicans and some Democrats in the senate to oppose it on those grounds. To answer these concerns, a leading Democratic senator amended the bill, requiring the sewerage plan to be approved by the Board of Public Works. The amendment also stipulated that the board could not approve a plan “which did not provide for scientific sterilizing treatment of the sewage before dumping it into the bay.”⁴⁵ With this proviso, the amendment passed, but it was not enough to appease the senator from Queen Anne’s County. The newspapers reported that he left the legislature in a state of fury intending to go home and refusing to come back to vote on any matter that day or the following day, threatening the Democratic majority. His fellow Democratic senators eventually managed to convince him to stay, but he reiterated that he would not support any bill that allowed for dumping of Baltimore’s sewage into the Chesapeake or Patapsco, treated or untreated. The following day, after a thirty-minute conference with Kirwan surrounded by his Democratic senators, he voted in favor of an amended bill that appointed three chemists from the Board of Works to examine the sewage and allowing the treated sewage to be dumped into the bay only once it had been “pronounced to be free from all impurities detrimental to the oyster or fish industry.”⁴⁶ Senator Kirwin was acting on behalf of the oyster industry and his constituents who understandably deplored the idea of swimming in Baltimore’s sewage. Even though he was a Democrat, he nearly scuttled the enabling act. Appeasing so many interests is one of the reasons it was difficult to build sewers for Baltimore.

When the new bill returned to the mayor, he was very pleased with the results but decided to wait on a council decision in the fall, stating that the citizens of Baltimore needed time to mull over the facts. Again the means of building sewers for Baltimore were more or less in place, and the council stalled. Finally, in the late fall of 1901, tired of waiting for council to act on its own, the Municipal Art Society drafted language for new sewers. An elite club, the basic mission of the society was to increase the display of art in Baltimore, but it also concerned itself with urban planning. It was the society, rather than the city, that engaged Frederick Law Olmsted to develop a new park plan for Baltimore. The society initially paid for his services and later convinced the city to reimburse the club for fees and publication costs. Unlike the celebrated Olmsted report, the sewer plan did not make it into the society’s memoirs. Mendes Cohen, chief of the sewerage commission, was on the board of directors of the Municipal Art Society. Similar to the tactic used for the Olmsted plan, Cohen likely used the society as a means to push through a plan that failed in regular political channels.⁴⁷ Indeed, the art society’s language for the sewer plan was a near match to the earlier amended act. It did not permit Baltimore to dump untreated sewage or any effluent that would be harmful to the oyster or fish industry into either the Chesapeake Bay

or the Patapsco River. Payment for the sewerage would come from assessments of properties along the sewer lines and the municipality would be given the right to force dwellings to hook up to the service. It also gave the municipality the right to enforce property owners who hooked up to the system to clean out and bury their privy vaults. In addition to funds raised from assessments, the mayor and the Sewerage Commission would be granted the right to set an annual sewer-use fee.⁴⁸

Now that the sewer plan had the support of Baltimore's elite, it had greater initial success than the council's proposal. The bill went to the Senate and House and received general approval. The only sticking point was the makeup of the sewerage commission. At first, Democrats and Republicans were appointed in equal number, but Democratic senators managed to reassemble the commission so that only one Republican was in place. In the meantime, a House delegate proposed the Municipal Art Society's Act with an equal division of commissioners along party lines, but the Senate was unwilling to compromise.⁴⁹ With the bill in a virtual deadlock, another private concern offered to build the sewers and permit the city to manage them, and promised to get rid of the Sewerage Commission altogether. Mayor Hayes rejected a private scheme for what he called a public utility. For Baltimoreans witnessing the party bickering in Annapolis, the plan must have held some appeal, but the proposal did not get past the city council.⁵⁰ The city was determined to make the sewage system a public enterprise, but the bill that would allow it to do so was stalled in the state legislature. With the Senate and House unable to agree on the makeup of the commission, the sewerage bill failed.⁵¹ Baltimore was again the victim of party politics conducted in a city far from its boundaries, a source of frustration for citizens and city leaders.

Chesapeake for Cheapskates: Dilution a Bargain

The defeat of the sewer bill put the issue back into the hands of the council. Because the question of funds was always in the minds of the taxpayers and those opposed to the project, the mayor decided to sell the municipally owned Western Maryland Railroad, for which the city would receive \$4.2 million, to finance the sewer works without interference from Annapolis. Since this was not enough to cover the proposed sewage treatment method, the mayor once again pushed the "dilution is the solution" plan of dumping raw sewage into the Chesapeake. This brought forceful opposition from a number of points, including the oyster business and the Municipal Improvement League (a reform and progressive organization), which opposed the sale of the railroad without permission from the people and also the makeup of the Sewerage Commission, which by this time was made up of a number of members from the Municipal Art Society and not the Municipal Improvement League.⁵² The mayor's attempt to sidestep the state legislature failed the following year when the General

Assembly passed an act prohibiting the city from dumping its sewage into the bay, effectively defeating any sewer proposal without state approval. Despite the economic and population primacy of Baltimore, rural legislators like Senator Kirwin held disproportionate power in the city's affairs. From the point of view of surrounding counties, Baltimore's attempt to dump sewage into the bay was a sign of its arrogance and irresponsibility. The bill ensured that Baltimore would have to follow state rules.⁵³

Fire and Civic Pride

Baltimore's devastating fire of 1904 changed the city's outlook on large, comprehensive works and the politics that stalled their implementation. The fire burned most of the 60 acres of the commercial district, and the \$5 million from the sale of the Western Maryland Railroad went to reconstruction rather than sewers.⁵⁴ Though the funds slated for the sewers went in another direction, the rebuilding of downtown Baltimore fostered a new civic spirit and "an increasing sense of urgency to compete with other cities for economic development."⁵⁵ For Baltimore and other cities, major improvement projects often followed "excitements" such as fires, war, or the arrival of a transforming technology like the railroad.⁵⁶ Like the celebrated rebuilding of Chicago after the great fire of 1871, Baltimore was imbued with a new sense of civic duty and primed for investment in public works.

In the spring of 1905, the question of whether to build sewers finally made it to the voters who nodded in favor of a comprehensive system with separate storm and sanitary sewers. To comply with state requirements, the design included primary and secondary treatment of human and industrial wastes before dumping it into the Chesapeake. The sewer plan divided the city into high- and low-level districts. In the high district, sewage would flow by gravity to the treatment plant at Back Bay. In the low district, gravity carried the sewage to a pumping station on the harbor and from there joined the outfall sewage pipe flowing to Back Bay (Figure 1).⁵⁷ Just under two-thirds of the registered voters went to the polls and passed the sewer loan by a 3 to 2 majority. Of the 24 wards, 18 voted in favor of the loans. Opposition came from East Baltimore, the central downtown wards, and two of the southern wards, where local leaders convinced voters that the new loans would be too great a financial burden. Despite progressive reforms, ward politics continued to hold sway in the city. An act passed earlier in the year by the General Assembly allowed the city, subject to referendum, to spend \$10 million on the sewer system. Initial budgets fell short of costs. In 1911, the Assembly permitted the city to borrow another \$13 million to complete the works.⁵⁸ Despite earlier disagreements and suspicions, the state assembly and city council cooperated on the massive public works project.

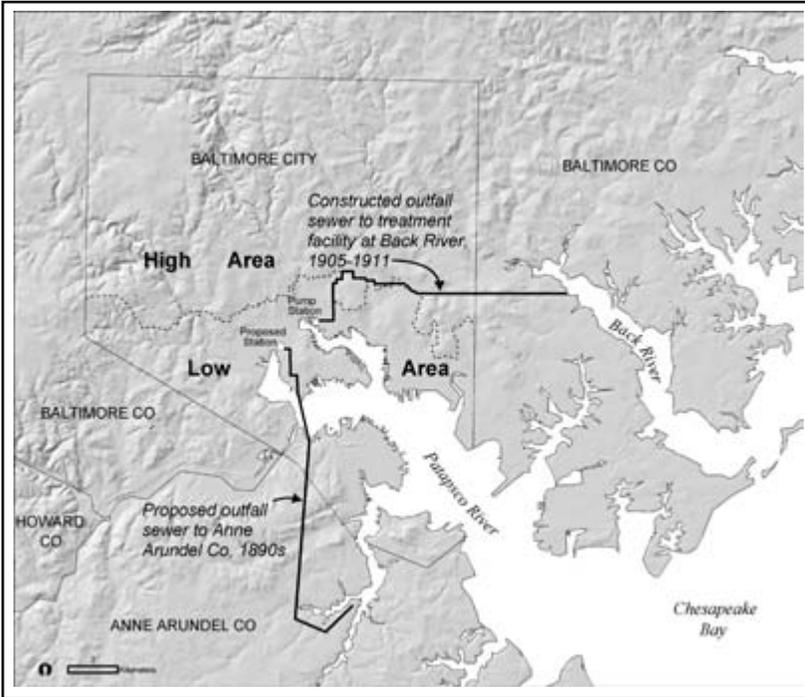


Figure 1. Early proposals for wastewater removal called for the waste to be piped from a pumping station ("proposed station") near the Middle Branch to Anne Arundel County where it would trickle through sand and be dumped into the Patapsco River and eventually into the Chesapeake Bay. Opposition from oyster merchants, public health officials, and surrounding counties eventually resulted in a new design that would carry the wastewater to a secondary treatment facility at Back River. Gravity in the High Area carried the wastewater to the facility. Drainage in the Low Area had to be pumped from a low point on the harbor to the outfall sewer.

Approval of the sewers happened at a time when, metaphorically, all the planets aligned. Democrats controlled the city council and state legislature, Baltimore was going through a construction boom, and the great fire of 1904 rallied citizens around the cause of rebuilding the city better than it had been before. Assessments increased after the fire, municipal debts would be paid off by the time expenditures were highest for sewer construction, and the annexation of a large portion of Baltimore County was expected to increase municipal coffers.⁵⁹ The oyster industry was successful in the struggle for sewerage, but its victory was short-lived. Industrial pollutants of the twentieth century reduced oyster numbers to 1 percent of what they were in the nineteenth century. From the 11 million bushels of oysters in the 1880s, the catch fell to about 150,000 bushels a year.⁶⁰

While oysters did not weather the changes, Baltimore's public health improved in the ensuing years. By 1910, the scourge of typhoid had finally been eliminated. The new sanitary sewers, along with a milk ordinance and chlorination of water, improved the city's public health.⁶¹ Modifi-

cation of the city charter in 1898, giving the Health Department more authority and taking it out of the realm of machine politics that dominated in the 1880s, could also take credit for public-health improvement. The growth of a professional bureaucracy and technical experts in city administration removed much of the cronyism that existed in the nineteenth century.

Conclusion

Baltimore's experience with sewer building, as an example of public infrastructure provision, is similar in many respects to that of other North American cities. Making the transition from commercial to industrial city, from a population of thousands to close to a million, from dirt roads and horse and wagon to electric streetcars running on paved streets, was difficult, and city administrations generally lagged behind technology. Baltimore's administration lacked the capital, the professional expertise, the legal means, and sometimes the will to build something on such a large scale and it was not unique among North American cities.⁶²

What is exceptional about Baltimore's history of sewer provision is how long the city delayed in building the system. Contemporary health officers remarked on the good fortune of Baltimore given its inadequate drainage. Its death rate was not exceptionally high, despite the fact it did not have a sanitary means of dealing with domestic waste, and that is one explanation for the delay in completing the works. Had cholera struck the city, council members, legislators, and voters would likely have reacted differently and earlier than they did. In that spirit, it was a crisis of another kind—the great fire of 1904—that spurred the community into action. In one sense, the delay was beneficial. Baltimore learned from the experience of other cities in the U.S. and abroad. It was able to build separate sewers from the beginning rather than having to retrofit at great expense. It was also able to apply new techniques in wastewater treatment, including trickling filters for secondary treatment at a time when most cities had cruder primary treatment only, and to build sewers of adequate dimensions and with up-to-date materials (including concrete) that extended their life.

Baltimore's story underscores the importance of understanding the politics of infrastructure provision. Urbanization is most often described as a product of technological innovation, economic cycles, industrialization, and population growth. Certainly, changes to Baltimore's infrastructure are a product of these urbanization forces. But what this case shows is that even though Baltimore was a modern, industrial city, the sewer plans were hindered by politics and a political system that made the provision of infrastructure difficult. Baltimore was lucky to build the sewers when it did, even though it happened long after most other cities had built their sewers. Long-standing animosity and suspicion between Baltimore and Annapolis (going back to slavery issues) was a real impediment to change.

At a time when state legislatures held disproportionate power over cities across the U.S.,⁶³ Baltimore's charter, which limited borrowing rights, tied the city's hands. But even when the city raised the necessary funds, the state was able to block the city's plans for sewers by disallowing the dumping of sewage into the Chesapeake. From the point of view of neighboring counties, however, the state was acting to stop Baltimore's sewage from polluting their shores. Understanding political and institutional barriers to change and, in this example, the conflict between a rapidly growing city and its hinterland, is critical to understanding the history of infrastructure provision and consequent transformations to the social and physical geography of the city.

In building the sewers, Baltimore transformed the built and natural environment. Sewage would no longer collect in stagnant pools in the alleys and gutters, but greater volumes of water were used than ever before. Cesspools would no longer leak into the Jones Falls, but thousands of flushing toilets would transform the hydrology of the watershed. Turning on taps created new demand for fresh water and the city flooded more territory to create reservoirs. Land along the harbor gained greater value, valorizing the commercial and industrial properties near the water body, and individuals could walk along its shores without holding cologned handkerchiefs to their faces or thinking thoughts of limburger cheese. Baltimore's social and environmental geography were fundamentally changed by the sewers, an infrastructure taken for granted by modern dwellers but sorely contested by generations before.

Acknowledgements

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Notes

1. *Baltimore News*, 16 July 1897, p. 10. Until its sale in 1910, the *Baltimore News* was the principal independent and reform minded newspaper in Baltimore.
2. Maureen Ogle, "Water Supply, Waste Disposal, and the Culture of Privatism in the Mid-Nineteenth-Century American City," *Journal of Urban History* 25: 3 (1999): 321-47.
3. The majority of infant deaths, mostly from gastrointestinal diseases associated with unsanitary conditions, were clustered in neighborhoods at lower elevations in 1880 Baltimore. See Sarah E. Hinman, "Urbanization and Public Health: A Study of the Spatial Distribution of Infant Mortality in Baltimore, Maryland, 1880," unpublished M.A. thesis (Ohio University, 2002).
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5. Teaford, *The Unheralded Triumph*.
 6. Maureen Ogle, "Water Supply, Waste Disposal, and the Culture of Privatism," 321-47.
 7. See Chapter 3 of Miles Ogborn, *Spaces of Modernity: London's Geographies, 1680-1780* (New York: Guilford Press, 1998).
 8. Sam Bass Warner Jr., *The Private City: Philadelphia in Three Periods of Its Growth* (Philadelphia: University of Pennsylvania Press, 1968); Jacobson and Tarr, "Ownership and Financing of Infrastructure."
 9. Anderson, *The Origin and Resolution of an Urban Crisis*.
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 24. *Baltimore News*, 30 November 1897, p. 6.
 25. Olson, *Baltimore: The Building of an American City*.
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 27. *Baltimore News*, 16 July 1897, p. 10.
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49. *Baltimore News*, 13 February 1902, p.1, 14 February 1902, p.1, 25 February 1902, p. 1.
50. *Baltimore News*, 27 February 1902, p. 1.
51. *Baltimore News*, 1 April 1902, p. 6.
52. *Baltimore News*, 24 January 1902, p. 12.
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