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Article abstract

Until the 1970s Canadian public works had been adequately described, but never extensively studied in the literature of urban history, which has focused on other aspects of the city-building process. Since then, Canadian public works history has been dominated by debates about the public versus private ownership of utilities. Scant attention has been paid to sewerage, which has only been alluded to in discussions about public health and sanitation. This paper aims to show that the historical provision of sewerage in Canadian cities was a fundamental part of the city-building process. It focuses on the provision of sewers in Toronto between 1870 and 1913 and argues that sewerage influenced and was influenced by contemporary debates about public health, local government intervention in the lives of citizens and the role of technology in the urban environment.

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Abstract:

Until the 1970s Canadian public works had been adequately described, but never extensively studied in the literature of urban history, which has focused on other aspects of the city-building process. Since then, Canadian public works history has been dominated by debates about the public versus private ownership of utilities. Scant attention has been paid to sewerage, which has only been alluded to in discussions about public health and sanitation. This paper aims to show that the historical provision of sewerage in Canadian cities was a fundamental part of the city-building process. It focuses on the provision of sewers in Toronto between 1870 and 1913 and argues that sewerage influenced and was influenced by contemporary debates about public health, local government intervention in the lives of citizens and the role of technology in the urban environment.

Public works make towns and cities possible¹

Public Works encompass a wide range of activities from building roads, bridges and railways, to providing people with clean water, garbage disposal and sewerage. Until the 1970s public works had been adequately described, but never extensively studied in the Canadian literature of urban history which has focused on other aspects of the city-building process.² Since then, Canadian public works history has been dominated by debates about the public versus private ownership of utilities like electricity, gas and water,³ with scant attention paid to sewerage. The American literature on urban infrastructure and sewers is much richer, featuring a critical dimension absent in its Canadian counterpart. In the American context Stanley Schultz has considered the role of sewers and sanitation in changing perceptions of the urban environment in the nineteenth century. With Clay McShane, Schultz has also considered the importance of city engineers to the planning and management of the urban environment and Joel Tarr has contributed useful work on the critical design decisions among different forms of sewer technology that municipalities faced in the mid-nineteenth century.⁴ The Public Works Historical Society identified a number of general themes in public works history in the United States. These included the social impact of public works policy, the transfer of technology from Europe to the United States in the early nineteenth century and the public versus private ownership debate.⁵

In the Canadian literature, questions about sewerage have only been alluded to in discussions about public health and sanitation. This paper aims to show that the historical provision of sewerage in Canadian cities was a fundamental part of the city-building process, influencing

and being influenced by contemporary debates about public health, local government intervention in the lives of citizens and the role of technology in the urban environment. The paper focuses on the provision of sewers in Toronto between 1870 and 1913, looking first at the relationship between sewerage and the efforts of the City Council to improve public health. This part of the paper builds upon Heather MacDougall's work on public health in Toronto.⁶ Sewerage, along with the provision of clean water, was a fundamental aspect of the fight for better public health, but was frequently neglected by budget-conscious city councillors who had a different agenda than that of health reformers. Conflicting theories of disease causation (contagionist and anti-contagionist) demanded different solutions, compounding the reluctance of the city council to opt for one method or another at the risk of being mistaken. The latter half of the paper will examine the building of the trunk sewer system in Toronto, depicting the problems involved and illustrating broader themes of importance in public works history.

Sewer Provision and Public Health

Approaching the last decade of the Nineteenth Century, Toronto no longer felt itself a compact little city, but a straggling big one, outgrowing its civic services as rapidly as a small boy outgrows his pantaloons.⁷

J.E. Middleton's words amply illustrate later Victorian Toronto's experience of economic gains from wealth-producing factories and the social problems of massing, crowding population. The extent of sewer building in Toronto's burgeoning urban environment was principally dependent upon five related factors. First, the cyclical nature of the economy and the financial status of the

Résumé:

Bien que jusqu'en 1970 les travaux publics canadiens aient été adéquatement décrits, ils n'ont jamais été abondamment étudiés dans les écrits traitant de l'histoire urbaine. Ceux-ci ont davantage porté sur d'autres aspects du processus d'urbanisation. Depuis lors, l'histoire des travaux publics canadiens a été dominée par les débats visant à déterminer à qui appartiennent les services publics : au secteur public ou au secteur privé. On s'est très peu intéressé à l'aménagement des systèmes d'égouts; il en a été uniquement question dans les discussions sur la santé et l'hygiène publiques. Le présent article veut démontrer que l'aménagement de systèmes d'égouts dans les villes canadiennes a été un élément essentiel du processus d'urbanisation. Il insiste sur l'aménagement d'égouts à Toronto entre 1870 et 1913. L'auteur soutient que les débats contemporains sur la santé publique, l'intervention des administrations locales dans la vie des citoyens et le rôle de la technologie dans l'environnement urbain ont été influencés par l'aménagement de systèmes d'égouts et vice versa.

city which was itself influenced by the second factor, the territorial expansion of the city achieved by annexation of suburban areas and the development of the horse-drawn tram. Third, from 1870 public health emerged as a major issue, enlarging the municipal government's traditional function. The fourth factor was the rise of a new doctrine of moral environmentalism that proposed sewers and sanitation measures as solutions to some of the problems of the urban environment. This was assisted, finally, by improvements in technology. The latter three points are of particular relevance to this paper.

It is important to understand how sewerage was provided in Toronto in 1870 as this had implications both for the sanitary condition of the city and for the efforts of Toronto's City Council to improve public health. Sewers were not laid automatically as a new street was built. Most homes had a privy pit in the yard which was either connected to a surface drain in the street or had to be emptied manually. The drain would discharge into a stream or river, unless it connected to one of a number of sewers, which flowed east into the Don River or south into Lake Ontario.

The complicated procedure for getting a sewer built dated from 1859. If the residents of a street wanted a sewer they had to submit a petition to City Council, signed by at least two thirds of the residents whose property had to add up to at least one half of the assessed value of the properties affected. Once the Council had accepted the petition, an inspector ascertained which properties were affected and what portion of the cost of the sewer would fall to each household. A tax was assessed taking into account the value of the house, its improvements, frontage, how much it would benefit by

the sewer, or a combination of all four factors.⁸

In theory the Council had the power to lay a sewer without consulting the residents but it could not force the residents to pay for it. Thus the Council chose not to lay sewers voluntarily, except in extreme circumstances.⁹ Figures 1 and 2 show the extent of sewer provision in 1869 and 1879 respectively. By 1879 the city had expanded outwards and new streets had been opened within its old boundaries. During this period more streets were serviced, particularly in the north-east corner of the city and almost all of these sewers were provided as a result of petitions.

Since 1848 a Board of Works (a Standing Committee of councillors and unelected city employees such as the City Engineer) had been responsible for overseeing sewer construction and other public works, and other tasks identified by the Board of Health such as street cleaning, street watering and garbage collection. By 1870 the relationship between the Board of Health and Board of Works appeared to be very close, for in 1869 City Council merged the activities of the two boards.¹⁰ In fact, the merger of the Board of Health with the Board of Works was a cost-cutting operation and did not give a new public health agenda to the Board of Works. The new arrangement outraged urban reformers because it came at a time of rising expectations of the quality of the urban environment. This trend is crucial. In the latter half of the nineteenth century, Canadian urban reformers engaged with the 'sanitary idea' which developed in England during the 1830s and 1840s.¹¹ Urban critics in Toronto 'discovered' connections between the quality of the physical environment and the bodily and moral health of citizens.¹² This notion of moral environmentalism was in part informed by new

theories arising from debates within the medical profession about the nature, causation and transmission of disease among urban populations. The older 'filth' or 'zymotic' theory (also known as miasmatic theory) asserted that accumulations of human, animal or vegetable waste, left to rot, produced noxious vapours which led to disease.¹³ It was on this basis the Board of Health and the Board of Works was merged in 1869 and upon which the duties of both were predicated. By contrast, a new theory was ad-

vanced by contagionists who believed that diseases were transmitted by specific germs. The majority of laypeople and doctors in Canada believed in a combination of the two theories.¹⁴ But, significantly, the 'sanitary idea' was predicated upon more than simply theory. The British 'sanitary idea' embodied a complex process of investigation, legislation and administration, leading to further information on sanitary conditions. From this idea, activists in Toronto developed a sense that urgently-needed health re-

form was achievable through legislation and active involvement in the lives of the citizens by local government.¹⁵

In merging the Board of Health and the Board of Works Toronto City Council did not foster the public health activity advocated by proponents of the 'sanitary idea' which was achievement of social improvement by ameliorating adverse physical circumstances through existing administrative frameworks.¹⁶ While the Board of Works was capable of undertak-

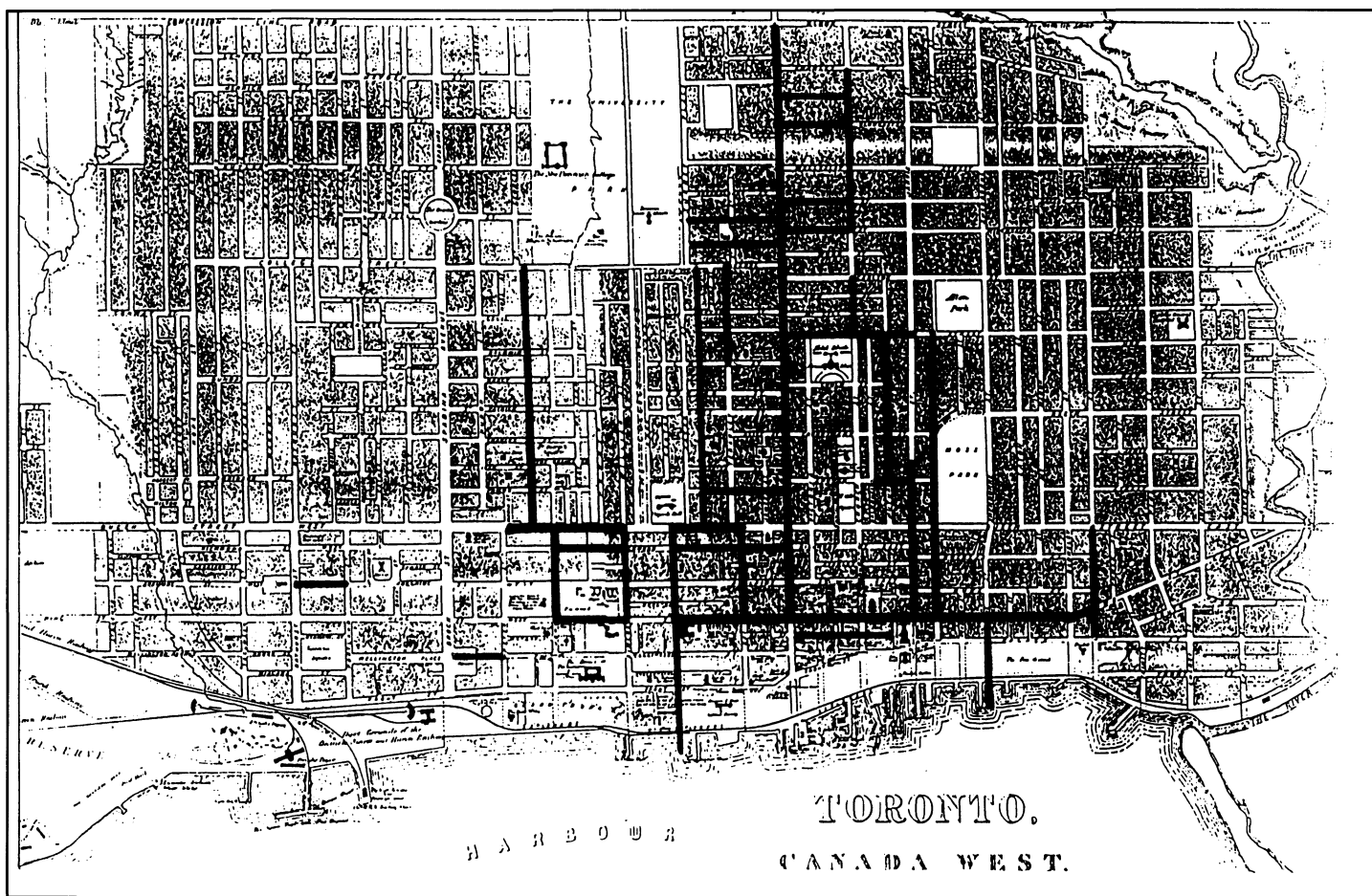


Figure One: *Extent of Sewers of all types and sizes in Toronto 1860-1869*
Base Map: Toronto Canada West, (Waterlow and Sons Ltd, 1859)

ing street cleaning and other duties, these constituted only one part of the 'sanitary idea'. The Board of Health had crucial medical *and* administrative roles to play, the latter in the collection of statistics and the introduction of legislation. The potential for undertaking these tasks was compromised by the merger of the Board of Health with the Board of Works. Toronto's municipal government did not meet reformers' expectations because the motivations and priorities of members of Council diverged widely from the example provided for them by the British institutional response to public health

questions.

Expansion of municipal public health efforts during the rest of the 1870s was inhibited by two factors. First, the economic downswing of the mid-1870s imposed financial constraints on government activity. Second, many Torontonians held the opinion that "the government which governs least, governs best" and while the City Council could appreciate the commercial value of a sanitary city, MacDougall has argued that "the preventative aspects of public health work which necessitated

the appointment of a trained, committed expert did not appeal to either their sense of the priorities or to their understanding of the obligations of municipal administration".¹⁷ Yet in apparent contradiction of the fact that government activity was curtailed, the number of sewers built in Toronto rose throughout the late 1870s and early 1880s. This can be attributed to three related factors: the diffusion of the 'sanitary idea' through the population; an important change in the city engineer's role in the provision of sewers; and changes in the financing of sewer building.

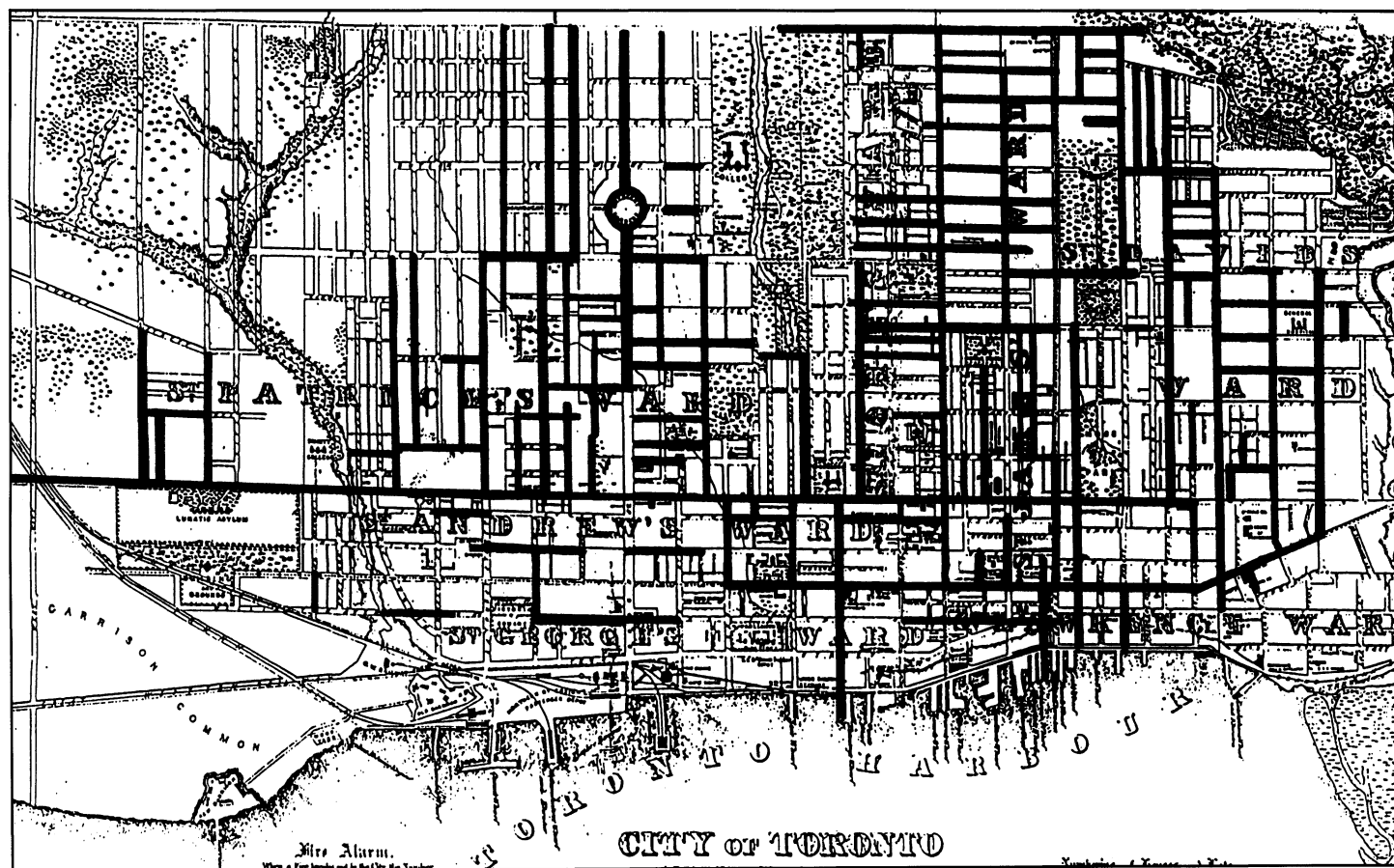


Figure Two: *Extent of Sewers of all Types and Sizes In Toronto 1870-1879*
Base Map: City of Toronto Compiled From Survey, Copp, Clark and Co., 1871)

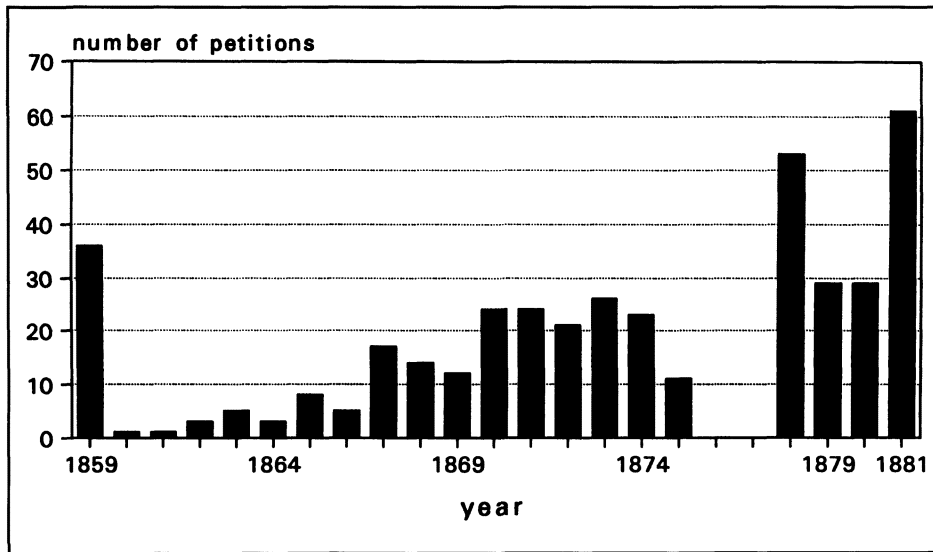


Figure Three: *Petitions for Sewers submitted to Toronto City Council 1859-1881.*
 Source: *City of Toronto, City of Toronto Council Minutes 1859-1881,*
 (City of Toronto Archives).

In Canada doctors and medical practitioners were the original champions of the 'sanitary idea', but the notion of the city as an unhealthy environment soon spread amongst middle-class lay-people—especially the liberal professional elite.¹⁸ Figure 3 shows the rising number of petitions for sewers, and complaints submitted to council about nuisances, inefficient and damaged drainage between 1859 and 1881. Whether successful or not, the increase in the number of petitions indicates a growing concern among individuals about their immediate surroundings. The number of petitions rose in the early 1870s, and while the data for the middle of the decade are unobtainable, the later years of the 1870s and the beginning of the 1880s saw the numbers of petitions rising still further, especially in 1878 and 1881.

Studies of public health in Toronto have overlooked a factor which led to more concern about the importance of local

sanitary conditions; after 1877, the city engineer had the power to allow insufficiently-signed sewer petitions to be passed on sanitary grounds.¹⁹ This occurred after the Provincial Government amended the law about petitions at City Council's request so that sewers could be installed where considered necessary in the opinion of Council.²⁰ However, in practice the City Engineer made the decision. Indeed, Council rarely disagreed when the City Engineer recommended that an insufficiently-signed petition be accepted because the sewer was needed on sanitary grounds. In 1878, 21 insufficiently-signed petitions for sewers were passed on sanitary grounds by the City Engineer, rising to 29 in each of 1879 and 1880, and then to 61 in 1881.²¹ These were petitions for sewers that would not have been accepted before 1877. Of course, it could be argued that petitioners simply did not make the effort to gain enough signatures, knowing that the petition could be passed anyway. Nevertheless the number of petitions ac-

cepted increased dramatically, demonstrating both the effects of removing 'red tape' and of granting the City Engineer discretionary powers.

The legislation made the City Engineer into the most powerful public health manager in Toronto's municipal government and its connections with the principles of the British 'sanitary idea' cannot be overlooked. The 'sanitary idea' stressed the role of engineers in the provision of good water supplies and effective waste removal.²² By granting the City Engineer the power to change the sanitary condition of the city the City Council moved, albeit slowly, towards endorsing one of the fundamental tenets of the 'sanitary idea'. Furthermore, the City Engineer's new powers inevitably led to increased involvement by the municipal government in citizens' lives. In the past, the city had built a sewer on the decision of the majority of property owners. After 1877 the City Engineer could *impose* an assessment for a sewer even where the majority had not demanded it, because he had the power to intervene on sanitary grounds. As mentioned above, this increase in sewer building occurred while other government activities were financially curtailed. This would appear to have been possible because it was one of the few municipal activities that was, in theory, paid for by direct taxation.

In the early 1880s a number of events converged and further changed the fortunes of public health activists in Toronto regarding the role of the municipal government in public health management. New Provincial legislation led to the appointment of a permanent Toronto Medical Health Officer in 1883, Dr. William Canniff. Now public health activists felt they had found an effective rallying point.²³ These developments supplied "the force necessary to shatter much of the inertia and complacency which

Toronto's city council had displayed concern for preventative medicine in the 1870s".²⁴

William Canniff was influenced by British and American theories of disease causation and prevention and he was a firm believer in zymotic theory. One of Canniff's first tasks as Medical Health Officer was to instigate a series of house-to-house inspections to raise public awareness about the unsanitary condition of the city, and about the existence of his department and its work.²⁵ We are greatly assisted in our knowledge and understanding of Toronto's sanitary condition in the 1880s onwards by the propensity of Canniff's department to record statistics. Despite the large number of sewers constructed during the late 1870s and early 1880s, privies were still in use. Of 11,000 homes visited in the 1885 house-to-house inspections, which covered two thirds of the city, 6,700 were still using privies, 28% of which were full and 20% foul.²⁶ Removing these pits was one of Canniff's priorities, but he was aware that this would take time and, backed by the Board of Health, he urged that they should be cleaned and disinfected annually.²⁷ In 1884 a new by-law gave the Medical Health Officer the power to assess petitions for sewers and to add his recommendation to the City Engineer's that petitions should be passed on sanitary grounds.²⁸ This validated the role of the Medical Health Officer in a realm that had previously been controlled by the Board of Works.

With the election of a reform-oriented municipal government under William Howland in 1886, the cause of public health was advanced still further.²⁹ Canniff, Howland and the new chairman of the Local Board of Health, Phillip Drayton, worked closely to combat enduring envi-

Figure 4
Miles of Sewers Constructed 1883-1900.

Year	Miles	Year	Miles	Year	Miles
1883	9.67	1889	N.A	1895	0.43
1884	11.48	1890	17.92	1896	0.35
1885	7.85	1891	11.65	1897	0.69
1886	5.41	1892	5.07	1898	0.79
1887	16.14	1893	3.23	1899	1.50
1888	20.78	1894	N.A	1900	1.00

Source: *Annual Reports of the City Engineer, 1883-1900* (City of Toronto Archives).

ronmental problems—including sewage. Heather MacDougall has argued that "the most vital area in which Canniff signally failed to achieve his goals was in the improvement of Toronto's water supply and sewage disposal facilities".³⁰ This view requires qualification. While Canniff was unsuccessful in his fight against dumping raw sewage in Lake Ontario, in other areas of sewer provision clear advances were made. In 1886, after a damaging corruption scandal, the Department of Public Works was reorganised, further facilitating sewer building.³¹ Figure 4 shows the increased mileage of sewers built after 1887 reaching over 16 and 20 miles in 1887 and 1888 respectively.³² The increased mileage also reflects the growing interference in people's private lives by the municipal government through inspection and changing sanitary practices. The question of intervention also arose in the public health area.

Whatever people's opinions about interference in their lives by the Medical Health Officer, the Health Department's efforts and the increased number of sewers petitioned for and built on sanitary grounds reduced the incidence of infec-

tious diseases in the 1890s. However, the health of the city was still threatened by the persistence of typhoid fever, with cases fluctuating between 200 and 300 per year from 1887 before rising dramatically to over 900 cases in 1890. In 1891, when two accidents in consecutive years caused sewage to pollute the drinking water, there were 860 cases. After this the number of typhoid cases started a downward trend, along with other 'filth' diseases such as Diphtheria and Scarlet Fever.

Throughout the 1880s the buoyant economy assisted sewer building so that when the economy turned down in the nineties, most streets in the city had been serviced. By 1895 construction had become a matter of yards rather than miles per year (Figure 5). The slowdown in sewer construction reflected the economic downswing, and the fact that the sewer system was relatively complete. Even the Medical Health Officer had stopped publishing the results of sanitary inspections in his annual report, suggesting that the sanitary problems of the city were felt to be under control. Thus, Canniff had indeed tackled the sewage problem. Nevertheless, while the building of

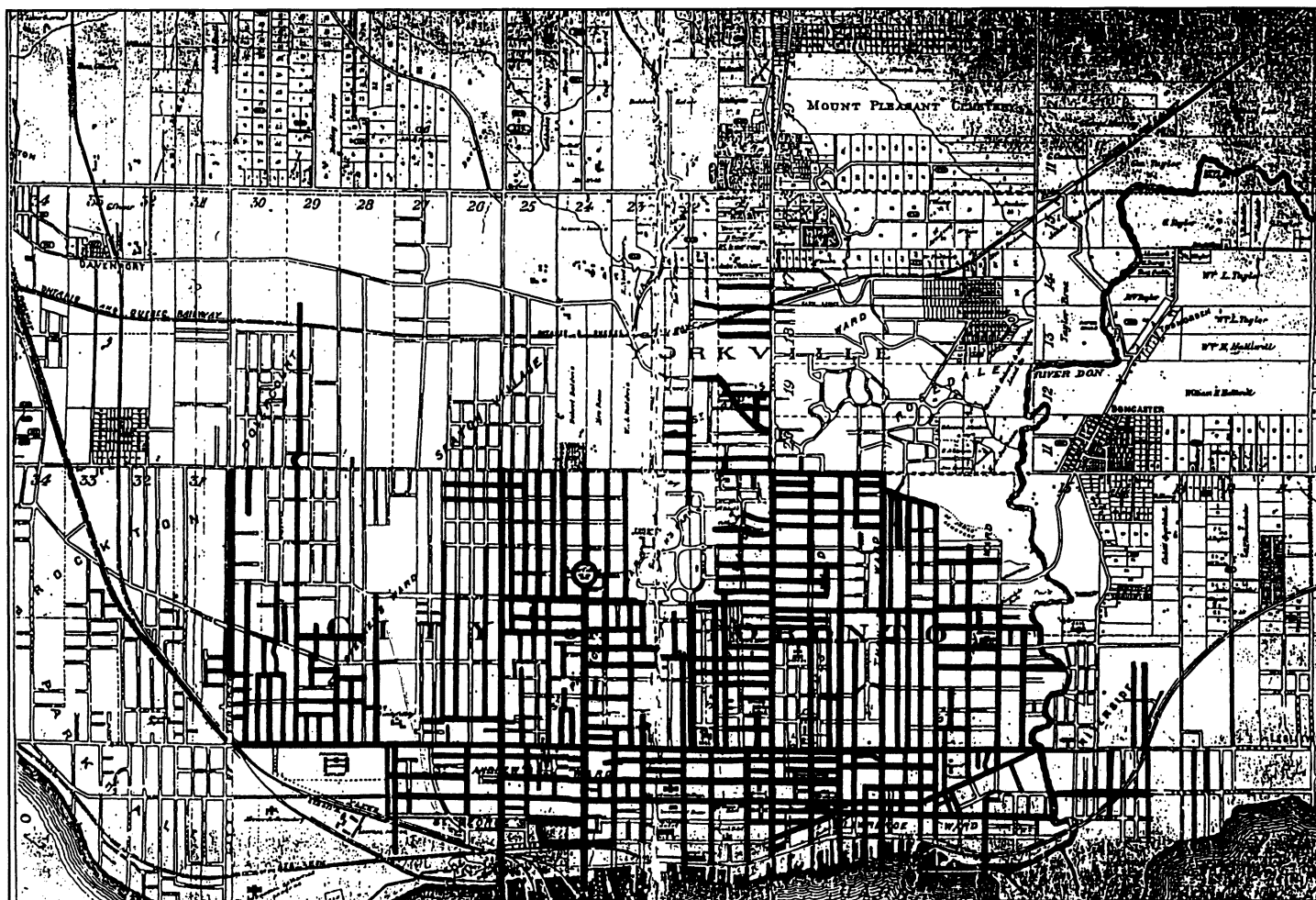


Figure 5: *Extent of Sewers of all types and all sizes in Toronto 1880-1889*
Base Map: City of Toronto and Suburbs from Atlas published by Chas. E. Goad, Civil Engineer, 1884.

individual sewers was no longer an issue for City Council, Canniff and his colleagues were frustrated by new questions that arose around building a trunk sewer system, and providing for sewage treatment and disposal after 1880. The history of the trunk sewer system illustrates many themes which are important in the provision of sewers in Toronto and public works history generally.

The Affair of the Trunk Sewer System

The City of Toronto had dumped its sewage and drawn most of its water from Lake Ontario since before the first sewer system was built in 1835. Until the mid-nineteenth century it was believed that the lake would dilute the sewage, preventing permanent pollution of the water. It became increasingly clear, however, that this was not the case. The problem of sewage discharging into the lake mani-

festated itself as a dreadful odour along the lake shore and this was perceived as a serious health threat because of miasmas. Toronto's problem was compounded because the currents in the lake were deflected by the small island offshore—thus the water in the bay was relatively still and sewage sank where it was discharged. Laying outfall pipes further into the water did nothing to help matters. The answer lay in carrying sewage away from the city and discharging

it into deep water where currents could facilitate dispersion.

The question of an interceptor sewer for Toronto was first raised in the 1850s, but did not reappear until the Board of Works addressed the issue in the 1870s.³³ The plan was simple if expensive—a large trunk sewer bearing sewage eastward, discharging it into the Don River and thence to the lake at a cost of \$190,000.³⁴ The Council ordered Charles Sproatt, the City Engineer, to report on the scheme and reports from past City Engineers and experts were considered.³⁵ Mayor Boswell summed up the situation in his inaugural address of 1884:

This work has been *talked about* for years. Will the semi-centennial Council permit it to remain a subject of talk for another year? I sincerely hope not. The sewage of this city is now assuming large proportions. Year after year new sewers are being erected. Where does all the filth from these sewers accumulate? In the Bay of Toronto, of which you and I are so proud. Gentlemen, this cannot go on with safety, for our Bay will soon become a cess-pool, and we cannot expect Toronto to retain the character for healthfulness it has hitherto borne if a remedy is not found by which the sewage may be taken elsewhere. See to it, then, that this great work be no longer delayed.³⁶

In spite of Boswell's appeal, the trunk sewer system was not mentioned again until 1885 in Mayor Manning's inaugural address, which only stimulated another round of reports. The lack of concerted action by the Council belied the urgency of the situation. Commercial activity was affected when solid sewage matter silted up the slips, preventing ships from docking and necessitating dredging.³⁷ Public health was also at risk. Disruptions in the water supply pumped from beyond the is-

land meant that citizens had to resort occasionally to the perilous practice of using harbour water.³⁸ Even after the waterworks became a public utility and water purity a public responsibility, plans for the trunk sewer did not progress.

In April 1886 the Council commissioned a report by an impressive array of engineers, Kivas Tully of Toronto, William McAlpine of New York and Charles Sproatt, the City Engineer.³⁹ They concentrated on two options for locating the sewer outfall, both of which proposed carrying the sewage eastward and discharging it into the lake, but only one of which included an expensive plan for a set of chambers to filter out solid suspended matter.⁴⁰ This was the first mention of any treatment for the sewage. The Council approved the cheaper of the two plans with the work to be done in stages, and the cost spread over a number of years, financed through an issue of debentures.⁴¹ Evidently the plan was not universally approved within the Council for the Mayor was forced to bring up a memorandum from the Medical Health Officer confirming the absolute necessity of the project in the face of "the question raised at this late hour about the need for the sewer".⁴² The Medical Health Officer accurately assessed the nature of the opposition:

... it has been proposed to construct intercepting trunk sewers ... by which the sewage may be conveyed to a point where it would not endanger the water supply of the City. The engineering difficulties to be overcome do not appear to be great, but the financial aspect of the matter presents obstacles of considerable moment. However, the taxpayer and the City must make up their minds to face the inevitable. It is submitted that if proper consideration be given to the matter it will be seen

that however great the outlay of money, there will be ample returns.⁴³

A final estimate was made for a project consisting of two main intercepting sewers and a main outfall sewer for nearly \$1,400,000.⁴⁴ In 1886 a by-law for the work submitted to qualified ratepayers for approval by vote was rejected overwhelmingly.⁴⁵ The Council reviewed the plan, modified it slightly, called in further reports from the Medical Health Officer and resubmitted the by-law to the qualified public in 1887. For the second time in two years the project was rejected by the ratepayers. The Mayor seemed to think that the by-law was rejected because of uncertainty over the most appropriate point for the outfall pipe.⁴⁶ However, it seems likely that the prospect of increased taxes to pay for the project weighed more heavily in the minds of the citizenry, as Canniff had indicated in its early stages.

In 1889 the question of the disposal of sewage and the quality of the water supply were formally recognised as a joint problem in a report by Rudolph Hering and Samuel Gray, two American consulting engineers engaged by the City Council. It had been known for some time that sewage polluted the water, but schemes for sewage disposal had viewed this problem separately from that of the water supply. Hering and Gray developed the notion that the water supply itself could be moved away from the source of pollution.⁴⁷

Hering and Gray's report was shelved while the Council continued to procrastinate, setting up a Trunk Sewer Committee, calling for more reports, and indulging in empty rhetoric about the necessity of the interceptor sewer system.⁴⁸ The economic depression in the mid 1890s prompted Mayor Fleming to suspend consideration of the scheme.⁴⁹

When the economy recovered, Mayor Coatesworth announced that the trunk sewer should "cease to be a speculation for the future and become the subject of immediate action".⁵⁰ The City Engineer, H. Rust, was sent to England to consult with G.R. Strachan, a civil engineer, on the problems of sewage disposal.⁵¹ A by-law was again submitted to the eligible electorate who rejected it in 1907.⁵² \$3,000,000 was estimated for the sewer system and more for septic tanks and contact beds to clarify the sewage.⁵³ The Provincial and local Boards of Health and the Faculty of Medicine at the University of Toronto urged the Council to act upon vast body of information endorsing the scheme.⁵⁴

Finally, on Tuesday, July 14, 1908, the qualified electorate of the City of Toronto approved a by-law for raising \$2,400,000 towards the construction of intercepting sewers and a sewage disposal plant and \$750,000 for the construction of a water filtration plant.⁵⁵ These were landmarks in Toronto's public works history. For the first time in its 74-year existence, the City of Toronto would stop discharging raw sewage into Lake Ontario. Furthermore, water drawn from the lake for human consumption would be filtered. In 1891 Kivas Tully had estimated that 12 tons of untreated solid matter were being deposited in the bay per day. In 1908, H. Rust, the City Engineer, reported that there was three to four feet of sludge on the bottom of the harbour.⁵⁶ However, even after the by-law was passed there were delays while a suitable site was located for the sewage treatment plant.

Work finally went ahead on the intercepting sewers, pumping stations and a treatment plant which were completed in 1913, sixty years after the idea was first mooted and over thirty-five years after the Council had begun to consider the plan seriously.

What were the reasons for the delay? The Council procrastinated for years before submitting a by-law to the city's rate-payers, ostensibly because they could not agree on an effective plan for the trunk sewer, but they may also have sensed a potential rate-payer revolt over the cost. Although this concern is not reflected in the Council minutes, it is reinforced by the reluctance of the qualified property owners to pass the by-law for the project in the 1880s. It is curious that the voters should veto a plan that would remove an obvious environmental pollutant to a greater distance, a decision which goes against the grain given the huge push for sewer-building in the 1880s. An 'out of sight, out of mind' attitude seems to have prevailed, producing a dichotomy between the willingness to pay for a sewer in one's own street and the unwillingness to pay increased taxes for a trunk sewer system. Although proponents of the sewer system argued that it would be of benefit to the whole city in terms of public health and the economy, the building of the sewer system would probably not directly affect the property or fortunes of the individual. On the other hand, a sewer into which one's property drained increased the value of that property and removed the smelly nuisance of the privy pit in the yard. The cumulative benefits of the sewer system clearly did not prove as persuasive an argument as many proponents thought.⁵⁷

Ultimately, it was probably a combination of factors that persuaded Council members and public alike to endorse the project. The typhoid epidemic in the '90s pointed to the dangers of continuing to pollute the harbour. Meanwhile, the economy picked up sufficiently for the project to arrive back on the political agenda by 1906. By then the project had received further endorsement from public health officials and even foreign engineers. Medical science had advanced to the

point where the risk to health from polluted water supplies was better understood and technological breakthroughs in the United States and Great Britain had resulted in more efficient means of filtering the sewage. Last, but by no means least, the harbour itself was a nuisance that could not be overlooked.

Conclusion

Toronto's experience of sewer provision reflects broader themes in public works history. Sewers were one of the first truly 'public works' and this is partly why they were affected so much by changes in the perceived responsibilities of municipal government. In a new twist to the public versus private ownership debate around utilities and in keeping with those in other North American cities, Toronto's city council struggled with the understanding that sewer provision would always rest in the public sphere because it generated exceptionally low returns and was therefore unattractive to private investors. Nevertheless, sewerage was absolutely necessary to public health and to the attractiveness of the city to outside investors. Administratively, sewer building was controlled by the Board of Works, but it became increasingly dependent on the skills and services of the City Engineer as the technology of sewer building developed. This was also the case with other public works, such as roads. The City Engineer's importance was reflected in the fact that, by 1877, he was armed with the power to provide sewers on sanitary grounds and was one of the most important arbiters of sewer provision in the city. Public health professionals and successive City Engineers in Toronto, as in other North American cities, were also instrumental in promoting the idea of carrying the sewage of the city away from the city to prevent contamination of the water supply. The technology for the trunk sewer, in common

with the other sewer and public works technologies in the city (such as electricity and gas), was derived from Great Britain and the United States.

The concerns of public health reformers were informed by the 'sanitary idea' from Great Britain which attempted to improve physical and moral health in the industrial city, partly through the provision of proper sewerage and clean water. The sewer-building boom in the 1880s stands as a measure of the reformers' success in convincing public and council alike of the need for proper sewerage. Furthermore the work of the City Engineer and Medical Health Officer represented a new dimension in the relationship between the public and the local government which emerged in the nineteenth century. In the American context, David Ward has observed that the justifications of public intervention were decisively changed between 1875 and 1900⁵⁸ and similarly in Toronto, as never before, local government was interfering in the lives of the citizenry, dictating minimum sanitary requirements that everyone must meet for the greater benefit of the city. For their part, many residents of the city welcomed the intervention to improve the urban environment in keeping with new expectations of living standards. The completion of the trunk sewer system began a new era in the provision of sewers in Toronto. City funds were directed to the construction of trunk and local sewers in newly-annexed areas to stimulate local development. By 1930, there were over 678 miles of sanitary sewer and 65 miles of storm and relief sewers and private drains were being installed as a matter of course from new buildings to the street line,⁵⁹ a quite different situation from that which had prevailed only sixty years before.

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Notes

1. Alan F.J. Artibise, "Building Cities" in *Building Canada – A History of Public Works*, ed. Norman Ball (Toronto: University of Toronto Press and the Canadian Public Works Association, 1988), 313.
2. See, for example, G.A. Stelter and Alan F.J. Artibise, ed., *Shaping the Urban Landscape – Aspects of the Canadian City Building Process* (Ottawa: Carleton University Press, 1982) and Eugene P. Moehring, *Public Works and Urban History: Recent Trends and New Directions*, Essays in Public Works History 13 (Public Works Historical Society, 1982), 1.
3. Paul Rutherford, *Saving the Canadian City, the First Phase, 1880–1920* (Toronto: University of Toronto Press, 1974); Christopher Armstrong and H.V. Nelles, *Monopoly's Moment – The Organisation and Regulation of Canadian Utilities 1830–1930* (Toronto: University of Toronto Press, 1986).
4. Stanley K. Schultz, *Constructing Urban Culture – American Cities and City Planning, 1800–1920* (Philadelphia: Temple University Press, 1989); Stanley K. Schultz and Clay McShane, "To Engineer the Metropolis: Sewers, Sanitation and City Planning in late nineteenth century America", *Journal of American History*, 65 (September 1978) 389-411; Joel A. Tarr, "The Separate Vs. Combined Sewer Problem – A case Study in Urban Technology Design Choice", *Journal of Urban History*, 5(3) (May 1979) 308-339.
5. Clay McShane, "Essays in Public Works History", *Journal of Urban History*, 10 (February 1984), pp.223-228.
6. H. MacDougall, "The Genesis of Public Health Reform in Toronto 1869–1890" *Urban History Review* 10,(3) 1982; also by MacDougall, "Public Health and the 'Sanitary Idea' in Toronto 1866-1890" *Essays in the History of Canadian Medicine*, ed. Wendy Mitchinson and Janice Dickin McGinnis, (Toronto: McCellard and Stewart, 1988), and *Activists and Advocates – Toronto's Health Department 1883–1983* (Toronto: Dundurn Press Ltd., 1990).

7. J.E Middleton, *The Municipality of Toronto – A History*, Volume I (Toronto: Dominion Publishing Company, 1923) 337.
8. For a more detailed examination of this procedure see Catherine Brace, *One Hundred and Twenty Years of Sewerage – The Provision of Sewers in Toronto 1793–1913*, (Unpublished University of Toronto M.A. Thesis, 1993) 74–78.
9. For instance, where frequent flooding occurs, damaging private property resulting in legal action against the Council.
10. MacDougall, 1982, 1.
11. See Felix Driver's excellent "Moral Geographies: social science and the urban environment in mid-nineteenth century England", *Transactions of the Institute of British Geographers* 13, 1988, 275–287.
12. MacDougall, 1988.
13. *Ibid.*
14. MacDougall, 1982.
15. MacDougall, 1988.
16. *Ibid.*
17. MacDougall. 1982, 3.
18. MacDougall, 1988. The question of who precisely were the vocal public advocates of a healthy city in Toronto has yet to be comprehensively addressed. A few names are prominent in the public health literature, but research questions remain on the intriguing groups of 'interested citizens' who participated in efforts to promote public health and urban reform.
19. City of Toronto, *An Act Respecting the City of Toronto, the Toronto Water Works and other matters*, 41 vic, c.39, section 1 (1877).
20. City of Toronto, *City of Toronto Council Minutes 1876*, (hereafter *Council Minutes 1876*), January 24, Minute Number 87, 14-15 (City of Toronto Archives); Province of Ontario, "Powers of Municipal Councils as to Drainage and other Improvements paid for by the Local Rate", *An Act respecting Municipal Institutions in the Province of Ontario*, 36 vic, c.48, division xii, section 447, 1873.
21. City of Toronto, *City of Toronto Council Minutes 1878, 1879, 1880 and 1881*, (City of Toronto Archives).
22. MacDougall, 1982.
23. *Ibid.*
24. *Ibid.*, 3.

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25. MacDougall, 1988.
26. William Canniff, "Results of House to House Inspections", *Annual Report of the Local Board of Health 1885*, RG 11, Box MFM (City of Toronto Archives) 6.
27. City of Toronto, *Annual Report of the Local Board of Health 1887*, (City of Toronto Archives) 3.
28. City of Toronto, "By-Law Number 1 – A By-law Respecting Local Improvements and Special Assessments thereof" *City of Toronto Council Minutes 1884*, (hereafter *Council Minutes 1884*), By-law Number 1522, Appendix Number 258, 1099 (City of Toronto Archives).
29. MacDougall, 1988.
30. MacDougall, 1982, 6.
31. This interesting and lengthy scandal is detailed in Catherine Brace, *One Hundred and Twenty years of Sewerage – the Provision of Sewers in Toronto 1793–1913*, (unpublished University of Toronto M.A. Thesis, 1993) 121–131.
32. Charles Sproatt, *Annual Reports of the City Engineer, 1883–1900* (City of Toronto Archives).
33. Wayne Reeves, *Visions for the Metropolitan Waterfront: Planning in Historical Perspective*, A Report for the Metropolitan Toronto Planning Department, Toronto, February 1992.
34. City of Toronto, *Council Minutes 1876*, March 27, Minute Number 542, 94 (City of Toronto Archives).
35. City of Toronto, *City of Toronto Council Minutes 1882*, January 23, Minute Number 73, 16, August 7, Minute Number 718, 200.
36. City of Toronto, "Mayor's Inaugural Address", *Council Minutes 1884*, January 21, Minute Number 4, 3 (City of Toronto Archives).
37. Reeves, 39.
38. *Ibid.*
39. City of Toronto, "Committee on Works Report Number 7", *City of Toronto Council Minutes 1886* (hereafter *Council Minutes 1886*), incorporated into Executive Committee Report Number 11, April 12, Minute Number 432, Appendix Number 32, 183 (City of Toronto Archives).
40. The reports are detailed in City of Toronto, *Council Minutes 1886*, August 2, Minute Number 883, Appendix Number 78, 472. Charles Sproatt, the City Engineer, developed his ideas in his own report to the Council in 1886: Charles Sproatt, untitled report to the Committee on Works on the disposal of sewage in the City of Toronto, 1886, *Water Supply and Trunk Sewer Reports*, RG 1, Box 1 (City of Toronto Archives).
41. City of Toronto, *Council Minutes 1886*, August 18, Minute Number 907, 228.
42. City of Toronto, *Council Minutes 1886*, September 2, Minute Number 950, 251.
43. *Ibid.*
44. City of Toronto, "Committee on Works Report Number 21", *Council Minutes 1886*, incorporated into "Executive Committee Report Number 33", September 2, Minute Number 959, Appendix Number 146, 779.
45. City of Toronto, *City Council Minutes 1886*, October 11, Minute Number 1027, 267. S. Morley Wickett comments that in Ontario the municipal vote was given to ratepayers (i.e. occupiers of houses) with an income of \$400, or with realty of \$400, but he notes that Toronto regularly tried to lower this limit. S. Morley Wickett, 'City Government in Canada' (1902) in Paul Rutherford, *Saving the Canadian City, the First Phase, 1880–1920* (Toronto: University of Toronto Press, 1974), 287–302.
46. City of Toronto, "Mayor's Inaugural Address", *City of Toronto Council Minutes 1888*, January 16, Minute Number 4, Appendix 1, 1–14 (City of Toronto Archives).
47. Rudolph Hering and Samuel M. Gray, *Report on the Extension of the Water Supply and on the Disposal of the Sewage of the City of Toronto 1889*, RG 1, Box 1 (City of Toronto Archives).
48. See, for example, City of Toronto, *City of Toronto Council Minutes 1890*, January 20, Minute Number 11, 6 (City of Toronto Archives); City of Toronto, *City of Toronto Council Minutes 1892*, October 10, Minute Number 969, 299, November 7, Minute Number 1053 (City of Toronto Archives); City of Toronto, *City of Toronto Council Minutes 1893*, January 16, Minute Number 38, 39, 7 (City of Toronto Archives).
49. City of Toronto, *City of Toronto Council Minutes 1896*, January 20, Minute Number 4, Appendix 1C 3 (City of Toronto Archives).
50. City of Toronto, *City of Toronto Council Minutes 1906*, (hereafter *Council Minutes 1906*), January 8, Minute Number 4, Appendix C, 3 (City of Toronto Archives).
51. G.R. Strachan, "Report on Toronto Sewage", August 8th, 1906 in City of Toronto, *Council Minutes 1906*, September 10, Minute Number 611, 240, Volume 1.
52. City of Toronto, *Council Minutes 1906*, November 12, Minute Number 732, 298, Volume 2; City of Toronto, *City of Toronto Council Minutes 1907* (hereafter *Council Minutes 1907*), January 7, Minute Number 827, 384, Volume 1, (City of Toronto Archives).
53. City of Toronto, "Board of Control Report Number 26", *Council Minutes 1907*, November 11, Minute Number 544, Appendix A, 1387.
54. City of Toronto, *Council Minutes 1906*, November 26, Minute Number 750, 308, Volume 1; City of Toronto, *City of Toronto Council Minutes 1908* (hereafter *Council Minutes 1908*), May 11, Minute Number 245, 168, June 8, Minute Number 379, 189, (City of Toronto Archives).
55. City of Toronto, *Council Minutes 1908*, July 14, Minute Number 434, 218.
56. Reeves, 39.
57. The affair of the trunk sewer system highlights the limitations of Council and Committee minutes which tend to treat ratepayers as a group with homogeneous opinions. Future research might usefully delve into press reports, letters to the editor and editorials to address the question of ratepayer opinion in more detail.
58. David Ward, *Poverty, ethnicity and the American City, 1840–1925*, (Cambridge: Cambridge University Press, 1989).
59. Roger E. Riendeau, "Servicing the modern city 1900–30", *Forging a Consensus – Historical Essays on Toronto*, ed., Victor L. Russell, (Toronto: Published for the Toronto Sesquicentennial Board by University of Toronto Press, 1984) 162.