

Fire, Disease and Water in Ottawa **An Introduction**

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Volume 8, numéro 1, juin 1979

Fire, Disease and Water in the Nineteenth Century City

URI : <https://id.erudit.org/iderudit/1019389ar>

DOI : <https://doi.org/10.7202/1019389ar>

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Éditeur(s)

Urban History Review / Revue d'histoire urbaine

ISSN

0703-0428 (imprimé)

1918-5138 (numérique)

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Citer ce document

Taylor, J. H. (1979). Fire, Disease and Water in Ottawa: An Introduction. *Urban History Review / Revue d'histoire urbaine*, 8(1), 7–37.
<https://doi.org/10.7202/1019389ar>

Résumé de l'article

Vers la fin du dix-neuvième siècle, le contrôle des incendies et des maladies était devenu une réalité scientifique et technique qui ouvrit la voie à des transformations sociales dans la ville. Pour effectuer un tel contrôle, il fallut, cependant, présenter auprès des politiciens urbanistes un certain nombre de revendications parmi lesquelles une provision suffisante d'eau potable. À Ottawa, on répondit à ces nouveaux impératifs de la collectivité, à la fois chichement et lentement. L'explication de cette attitude réside, en grande partie, comme les trois articles qui suivent le suggèrent, non pas dans des difficultés pratiques, mais dans les politiques, spécialement dans leur base socio-économique et leur orientation idéologique.

FIRE, DISEASE AND WATER IN OTTAWA:

AN INTRODUCTION

John H. Taylor

ABSTRACT/RESUME

By the end of the nineteenth century control of fire and disease had become a scientific and technical reality that opened the way to a social transformation in the city. To effect such control, however, imposed a series of demands on urban politicians, among them one for an adequate supply of pure water. In Ottawa, the response to the new and necessarily collective imperatives was pinched, niggardly and slow. Much of the explanation--as the three papers that follow suggest--lay in politics, especially in its socio-economic base and ideological attitudes.

Vers la fin du dix-neuvième siècle, le contrôle des incendies et des maladies était devenu une réalité scientifique et technique qui ouvrit la voie à des transformations sociales dans la ville. Pour effectuer un tel contrôle, il fallut, cependant, présenter auprès des politiciens urbanistes un certain nombre de revendications parmi lesquelles une provision suffisante d'eau potable. A Ottawa, on répondit à ces nouveaux impératifs de la collectivité, à la fois chichement et lentement. L'explication de cette attitude réside, en grande partie, comme les trois articles qui suivent le suggèrent, non pas dans des difficultés pratiques, mais dans les politiques, spécialement dans leur base socio-économique et leur orientation idéologique.

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Fire and disease were powerful constraints on urban growth in the nineteenth century. Without their control, the city was fated to be a jury-built charnel house, drowning in its own pollution and pestilence, and in constant danger of destruction by conflagration. But by the end of the century, scientific and technological scourges afforded control of both disease and fire. An adequate supply of pure water was a central element in the prophylaxis. Water, coupled to modern fire-fighting organization and technology, and to building and zoning regulation, made large-scale, commercial construction a reality. Water, joined to health sciences, made modern health practices and rapid population growth possible. Ottawa's city fathers observed this potential for a human revolution with little enthusiasm or courage, and often with hostility.

A successful battle against death, apart from one against fire,

can alone be seen as central to the quality and nature of urban life in the twentieth century. It was a twin, in Canada at least, with the turn-of-the-century economic transformation in its impact on modern life. Indeed, the extent to which economic influences can account for contemporary development seems, from this view, rather more limited than generally believed. Certainly there was an economic transformation to an urban-industrial society that had wide-ranging impact, including demographic. Economics probably accounts for much migration into the city, and, arguably, through improved living standards, reduced mortality in the city.¹ Equally, the excesses of industrial society provoked in some measure the efforts to solve problems of disease. But ultimate resolution was rooted in public health, not economics. And as death rates fell, cities grew strongly from their own population resources. It was a phenomenon that produced a demographic and a social transformation in its own right.

Demographic self-sufficiency produced, among other things, it has been argued, a host of redefinitions in urban society, including a redefinition of work, a divorce between social rank and possession of land, and a psychological reaction to crowding.² In addition, those born in cities acquired urban skills early, and once they stopped dying off in large numbers, remained as formidable economic competitors to migrants. Urban populations, of course, soon matched those of the countryside, altering social perceptions and political power, surely, as McNeill says, "...a fundamental axis of humanity's encounter with the twentieth century

¹Thomas McKeown and R. G. Record, "Reasons for the Decline of Mortality in England and Wales in the Nineteenth Century," Population Studies, Vol. 16 (1962), pp. 94-122. The authors cite three major causes for decline of mortality in the second half of the century: rising standard of living, especially diet, responsible mainly for the decline of tuberculosis and to a lesser extent of typhus; hygienic changes of the sanitary reformers, for decline of the typhus, typhoid and cholera groups; and adaptation of host and disease, for scarlet fever, and possibly tuberculosis, typhus and cholera.

²William H. McNeill, Plagues and Peoples (Garden City, N.Y.: Anchor Press/Doubleday, 1976), p. 275.

all around the globe."³

Internally, population mixes were altered. Cities built on migration would tend to be composed of mature individuals; cities built from their own population resources would be demographically younger and likewise require more facilities for the young, like schools. Costs would be heavy to support a large, non-productive portion of the population. Progress was perhaps easier when the cities were a killing ground, especially for the young.

Central to this human or social transformation was, as noted, the "sanitary revolution" in which Canada shared, but was conveniently pioneered elsewhere. The early phases of the "revolution" are generally attributed to the fear inspired by various nineteenth century pandemics, especially cholera. In Upper Canada, cholera, in 1832, certainly inspired the first health act, in 1833, but typhus in 1847 and Yellow Fever (in the United States) in the 1870s, along with the threat of cholera, especially in 1849 and 1866, provoked the more substantial early legislation. Perhaps more important for Canada than epidemics was the British example. Much Canadian legislation followed and replicated British initiatives.

As elsewhere, however, it is the 1880s that see "systematic" public health reinforced by a science based on the germ theory of disease. The eureka moment can conveniently be attributed to Koch's isolation of the anthrax bacillus in 1876. Isolation by others of the typhoid, leprosy and malaria bacilli in 1880, and tuberculosis, again by Koch, in 1882, dramatized the new scientific thesis.

In a practical sense, these discoveries established a scientific paradigm on which a health technology could be constructed. They also resolved a long-running controversy over disease etiology that through much of the nineteenth century impaired efforts of sanitary reform.

With the scientific and sanitary breakthroughs at the end of the century, the death rate fell, and fell dramatically enough in the face of a declining birth rate to enable cities to grow in a significant way

³Ibid.

from their own demographic resources as well as from migration. The widely accepted premise is that nineteenth century cities were "population sumps," killing off more people than they produced.⁴ Urban population maintenance and growth thus depended upon a bucolic cradle. Matters got worse as the century progressed.⁵

The result was a sort of race between the development of medical skills among Europe's doctors and public administrators...and the intensification of infections together with chronic ills provoked by altered conditions of living.

Until near the end of the nineteenth century the race remained close in most of the world's great cities.⁶

In Canadian cities the race was probably not so closely run. From the little evidence available for urban areas in Canada, it would seem that birth rates remained somewhat higher than death rates. Statistics are too uncertain to say much more.⁷ In Ottawa's case, something in the order of 25 per 1,000 for both births and deaths seems

⁴The most frequently used source for this premise is Adna F. Weber, The Growth of Cities in the Nineteenth Century: A Study in Statistics, Studies in History, Economics and Law, Columbia University, 11 (New York and London, 1899), p. 238.

⁵McNeill, Plagues and Peoples, p. 259. It certainly seems true for the United States, where virtually unbroken runs of mortality statistics are available for New York, Boston, Philadelphia and New Orleans for the period 1815 to 1914. Quarter-century averages, in deaths per 1,000, were 28.1, 30.2, 25.7 and 18.9. See F. L. Hoffman, "American Mortality Progress During the Last Half Century," in American Public Health Association, A Half Century of Public Health, M. P. Ravenel, ed. (New York: Arno Press and New York Times, 1970), p. 101. This is a facsimile of a 1921 publication.

⁶McNeill, Plagues and Peoples, pp. 259-60.

⁷In Ontario, the problem was two-fold: lack of compulsion to report vital statistics and lack of machinery to make reporting possible. Bylaws to require reporting were optional under the health act of 1849 and the municipal act of 1866. Ottawa's first bylaw provision requiring reporting was in 1868. But until 1874 there was no medical health officer to demand and to receive data. Even after 1874 his authority seems weak. For a generation, shoddy reporting is a chronic complaint in his annual report. Regular runs of statistics become available only in the 1880s when the federal department of agriculture began collecting "mortuary returns". But these data are questionable since based on medically uncertified returns from

plausible for the 1870s and 1880s.⁸ By the turn of the century, a change seems to have occurred. Death rates hovered around 18 per 1,000; birth rates around 25 per 1,000.⁹ The gap was capable of closing sharply. In the typhoid year of 1911, the death rate was reported as 20 per 1,000 (about the same as a good year in the 1880s) and the birth rate as 23.6 per 1,000.¹⁰

morticians. The practice was stopped in the 1890s. Improved procedures were begun in 1896 by the provincial registrar general. Data collected at the local level by the MHOs is by their own admission suspect. In his 1893 annual report Ottawa's MHO reported 792 as the "total number of certificates of death." "This I take to be evidently incorrect, as, in my estimation, the total mortality should be somewhere about 900." By 1895 he felt he had the numbers "approximately correct", but "...as records of the causes of death these statistics are misleading, and will have but little of the scientific value they should have so long as burials are permitted without a physician's certificate as to the cause of death." Available aggregated data are full of pitfalls. Some include stillborns, others not. Ottawa switched in 1884. Reporting periods vary. Some cities excluded deaths of non-residents; others included them, Ottawa to 1913. Much death, especially of exposed infants, was probably not recorded at all. Census mortality statistics for 1891 and 1901 seem to be low, even grossly low, and the procedure of preparing them is a revelation: see, Canada, Census of 1891, Bulletins 14 and 15; Census of 1901, Vol. IV.

⁸Based on the one available statistic for 1878 of 24/1,000 (including stillborns), and longer trends through the 1880s and 1890s of about 22/1,000 (excluding stillborns). This would conform to the pattern of Boston and New York from 1815 to 1914 where death rates per 1,000 by quarter-century averages were respectively: 21.3, 25.0, 23.8, 19.5; and 28.1, 32.6, 27.5, and 18.4. See F. L. Hoffman, "American Mortality," p. 101. Birth rates in Ottawa are virtually non-existent for the nineteenth century. In the early years of the twentieth century, however, the rate for the city lies in the 23-26 per 1,000 range, some 3-4 per 1,000 below the Ontario average and some 5-6 per 1,000 below the Canadian. Presuming this tendency held true in the nineteenth century, the birth rate for Ottawa would have been in the 25-28 per 1,000 range, or slightly higher than the death rate. See Table 1 for death rates.

⁹See Registrar General, "Annual Report," Ontario, Sessional Papers, for various years. Death rates compiled from the reports of Ottawa's medical health officer are in Table 1.

¹⁰Registrar General, "Annual Report, 1911," Sessional Papers, 1912, p. 18. Figures vary from those of the MHO of Ottawa because of a different reporting period. In 1911, Ottawa had the second highest death rate among Ontario cities; Carleton County (at 21.1/1,000) had the highest county rate.

Table 1: Death Rates, Ottawa, 1878 to 1915

<u>Year</u>	<u>Death Rate/1000</u>		<u>Death Rate/100,000</u>	
	<u>All Causes</u>	<u>Typhoid</u>	<u>Diphtheria</u>	<u>Tuberculosis</u>
1878 ¹	24.0 ²	33.3	12.5	329.2
1883 ¹	28.0 ²	30.0	56.7	240.0
1884 ³	22.5	32.3	--	200.0
1885	23.0	36.7	42.4	209.1
1886	26.7	45.7	137.1	180.0
1887	20.5	42.1	102.6	168.0
1888	23.0	112.5	185.0	165.0
1889	22.9	42.9	145.2	200.0
1890	21.8	44.2	90.7	211.6
1891	20.2	20.5	68.2	188.6
1892	21.1 ⁴	38.7	32.3	--
1893	18.6 ⁴	24.4	44.3	210.5
1894	21.7	34.0	158.0	170.0
1895	20.8	28.9	153.9	159.6
1896	17.2	40.4	51.9	176.9
1897	20.9	33.3	70.4	231.5
1898	20.3	30.4	42.9	226.8
1899	20.2	44.8	53.5	212.1
1900	19.1	31.7	61.7	186.7
1901	21.0	15.6	84.8	162.3
1902	--	28.2	26.9	179.5
1903	19.0	7.6	48.1	141.8
1904	17.9	26.2	19.9	133.3
1905	17.5	20.0	1.5	152.3
1906	16.2	20.7	16.3	153.9
1907	17.9	51.6	7.2	136.2
1908	17.6	26.2	19.9	133.3
1909	15.7	31.2	13.2	146.4
1910	16.2 ⁵	24.4	20.9	120.8
1911	14.9 ⁵	91.7	35.4	128.2
1912	16.3/14.1 ⁶	95.2	31.4	117.2
1913	18.9/15.3 ⁶	20.0	38.0	138.0
1914	18.4/15.3 ⁶	12.8	58.9	134.6
1915	17.5/14.3 ⁶	28.0	52.9	158.7

Source: Annual Reports of the Medical Health Officer, Ottawa.

Notes:

1. Year ending December 31.
2. Includes stillborn.
3. 1884 and all other years for year ending October 31.
4. Based on 792 death certificates. Health officer guessed there were 900 deaths.
5. The provincial registrar general put the rate at 20.0 for the year ending December 31.
6. The second, or "corrected" figure excludes non-resident deaths.

Some cities were determined to lose by default.

All the same, it is fairly clear that the cities of Canada by the twentieth century were increasingly able to grow from their own demographic resources. The result was that sharp increases in the numbers of city-born coincided with a strong rural-urban migration, and a massive European one, some of it city bound. In this sense the Canadian urban experience is unique. It is to be understood only in terms of three impulses to population growth working simultaneously. And of the three, natural increase is probably the most significant, though the least studied.

As speculative as the subject of death in the cities is, it is relatively well-served compared with fire. Literature on the control of fire and its impact on urban development is extremely thin, the notable major exception for Canada being the recent paper by John Weaver and Peter De Lottinville on conflagrations.¹¹

As an arguable hypothesis, it seems that fire tended to limit both the size and quality of nineteenth century buildings. That is, buildings of substance, excepting monumental ones, would likely be the exception until fire control was sufficiently effective to warrant the investment of large-scale capital over a long term, and also to bring fire insurance rates down to an economic level for large buildings. No matter how intrinsically sound a building, it was always under threat in the nineteenth century urban tinder box. The speculation is that much of the nineteenth century city was cheaply built because it was likely to be burned down.¹² That is not to demote builders' speculation, low incomes, lack of regulation and a number of other factors for the shoddy, shack-like construction typical of the nineteenth century city. Still, the rapidity with which burned-out areas rebuilt is testimony to the low level of capital requirements. Cities, after a fire, did not rise like a grand, new phoenix

¹¹"The Conflagration and the City: Disaster and Progress in British North America during the Nineteenth Century," unpublished paper delivered at the Canadian Historical Association Annual Meeting, London, June, 1978.

¹²Ibid., p. 2 for some confirmation.

as many civic leaders hoped, but as the same old shantytowns.¹³ Such rapid re-growth would seem unlikely had original capital investment been heavy. In the interim, the straightening of roads to permit access to fire engines, and a reduction in the number of woodframe structures proved the limit of most civic initiatives.

Equally, changes in the quality and nature of the nineteenth century building largely awaited the control of fire. The austere form of the modern commercial building, for example, was one of the early results of high insurance rates for architectural gingerbread.¹⁴ The high-rise variation of that austere form--that produced the typical city skyline of the twentieth century--awaited the development of professional fire-fighting, based on a high-pressure supply of water, along with zoning devices that separated out high risk areas, as much as it awaited structural steel, reinforced concrete and the Otis elevator. Again, capital was not likely to invest in a "skyscraper" beyond the reach of fire hoses and located in an urban tinder box. Insurance, too, would be prohibitive, if available at all.

There were, of course, exceptions, most of them monumental buildings dedicated to religion or politics. But the building as monument was paid for by the taxpayer or the faithful and was not, perhaps, subject to the usual constraints of capital accumulation. And if built as an act of faith in church or government, such buildings were necessarily imposing whether likely to burn down or not. These buildings dominated nineteenth century urban skylines. Twentieth century skylines waited on the building dedicated to profit, a building necessarily fireproof.

By the 1880s much theory relating to control of both fire and disease was established, and much of the technological apparatus to assert

¹³Ibid., p. 32.

¹⁴Ibid., p. 33.

such control had been developed. Yet in Ottawa, as well as other places, it took the better part of two generations to establish effective agencies and institutions to make disease and fire prevention a reality. A serviceable science and technology was no guarantee of rapid progress.

The central reason for such dilatory evolution seems to have lain in politics. For change, no matter how self-evident, was ultimately a political act that required the re-education of both politicians and their constituencies. It was also a political act that brought into play the fundamental cleavages and interests of the community. Racial, ideological and territorial differences had to be reconciled, along with those of class, property and business.

Change seemed to have proven too much for the Ottawa politician, as all the articles following illustrate. At best, their philosophy was one of change by crisis. There was, for example, no resolution to the fire hazards occasioned by piling lumber; the sawmills ultimately moved out of the city of their own accord. As for the control of typhoid and the related provision of pure water, the city fathers were more dragooned than reasoned into adequate provision of such services, notably by the threats of the fire underwriters, the provincial health officers, and the bad publicity of the health and pure water agitators.

In Ottawa, the search for pure water was a protracted one, repeated as one supply became foul or inadequate.¹⁵ Except for the rather tardy development of any public supply at all, and the curious and rather difficult relationship of the city and the senior government, lodged in Ottawa from the 1860s, it was typical of many cities.

Despite its location at the junction of two rivers, both in the early days presumed to have drinkable water, water was a rather difficult

¹⁵In this sense typical of many cities. For comparison see Nelson Manfred Blake, Water for the Cities, Maxwell School Series, III (Syracuse University Press, 1956), as perhaps the best of published material.

commodity to come by in early Bytown. Much of the townsite was 150 feet above the Ottawa and some distance west of the Rideau River. Early attempts to sink wells in the high, rocky ground failed and many residents resorted to the water of the Bywash, essentially a conduit for canal overflow that ran through the Lower Town. The Bywash, however, soon became popular as a common sewer and laundry, and ultimately was declared a public nuisance, though frequented until 1872 by "reckless persons" who used "its polluted waters for domestic purposes."¹⁶ By 1840 two wells had been sunk, one for the Upper Town and one for the Lower Town, and over the years such wells proliferated. With the establishment of local government in 1847, the wells became a responsibility of the town. But they were shallow, with a modest volume of water, usually inadequate for fire-fighting, and required incessant maintenance, especially to keep them ice-free (both inside and out) in winter. City council also had little success in keeping them clean. Despite council's admonitions, residents and visitors alike continued to water livestock at the wells, and the numerous carters and farmers persisted in washing their horses handy to the supply of water. Nor might Ottawans have too much confidence in a city council which when faced with a motion "...to clean out the well on Stewart Street, in which a dog had been drowned," would vote it down.¹⁷

The result of these problems was the emergence in Bytown of a small army of water carriers, who supplied both domestic and fire needs. They drew their supply from the Ottawa River using puncheons mounted on two wheels, or, in winter, on sleighs. Costs were high: 15 cents a barrel in summer; 25 cents in winter. In 1866, their charges to the city for supplying the fire companies were \$2,000 of a fire budget of \$5,093, or some five per cent of the city budget in total.¹⁸ They proved vigorous antagonists to proposals for a piped water supply, contributing both their votes and their fists to the opponents of the utility.

¹⁶City of Ottawa, Minutes, 17 April 1872.

¹⁷Ibid., 21 July 1856.

¹⁸"Finance Report," Minutes, 13 August 1866.

A first proposal for a piped supply appears in 1855, the year Ottawa became a city and assumed its present name. It and another in 1857 were buried in committee. But an 1859 proposal from T.C. Keefer, eminent Ottawan and ubiquitous railway and waterworks engineer, fared better.¹⁹ It was put forward in mid-June just as construction of the new "public buildings" was about to commence. Decision on design of the buildings and general oversight of their siting and construction, it might be noted, was by Samuel Keefer, assistant commissioner of public works and half-brother to T.C.

Though "general causes" were cited as requiring a waterworks, two elements were central to Keefer's scheme and subsequent ones. The first was fire protection. For want of adequate water, Ottawans had to pay high insurance rates and maintain an expensive fire department "...rendered comparatively useless for want of water."²⁰ The second was government. Keefer's scheme involved government at every step. The city would require an hydraulic site at Chaudiere Falls from the province for pumping. It would require a reservoir site on Barracks Hill, soon to become Parliament Hill, "...the most convenient, most elevated and in every respect the best [site] in the city...",²¹ for storage and distribution. It was also expected, as the scheme unrolled in 1860 and 1861, under the direction of the civil engineer G.H. Perry,²² that the provincial government might pay part of the capital and maintenance costs of the reservoir, or alternatively become the major cash customer for a city-financed scheme.²³

¹⁹Minutes, 13 June 1859.

²⁰"Report No. 2 of the Special Committee on Water Works," Minutes, 22 June 1860.

²¹Ibid.

²²The special committee recommended Keefer prepare a formal proposal at a cost of \$800. But a new "Water Works Committee" in 1860 recommended the job be given to Perry for \$500. The recommendation was adopted by council 18 July 1860 on a division that mainly pitted the Lower Town against the Upper Town.

²³See esp. "Report of the Waterworks Committee," Minutes, 18 December 1861.

By the end of 1861, this first proposal had stalled. Negotiations with the province over hydraulic site, reservoir site, and funding had broken down. Sectional antagonisms divided city council. The city was nearly bankrupt, in 1861 failing to sell its debentures at 87½. The scheme itself, a public and combined work of drainage, macadamization and waterworks "...the most perfect which can be desired...",²⁴ was probably too grandiose, and probably lacked a broad base of public support. Not only were the water carters antagonistic, but according to a retrospective report of 1870, "many of the principal ratepayers and most influential citizens have up to the present time considered the question of waterworks as premature...."²⁵ Council was also told that "...parties had been endeavouring to induce the government to adopt an independent system for supplying the Parliament and Departmental buildings with water...."²⁶ And, indeed, the government did finish this first initiative by proceeding in 1864-65 to build its own internal waterworks.

Some five years passed and little happened, despite reports, complaints, high insurance rates, petitions, public meetings, repeated editorializing over waterworks, and promotion of a private scheme in 1866. Finally in 1869 resort was had once again to T.C. Keefer, who came to city council armed with new technology.²⁷ Perfection of the high pressure or "Holly" system made possible provisions of a pumped supply of piped water without resort to a reservoir and gravity. The city no longer needed the now unobtainable reservoir site on Parliament Hill, only an hydraulic site at Chaudiere. Moreover, the new system, with its "free" pumping, and nearby Ottawa River supply, was relatively cheap, and in a pinch could survive financially without its largest potential customer, government.

Fires that raged in the Ottawa Valley near the city in October of

²⁴Ibid., Minutes, 15 July 1861.

²⁵"1st Report of the Special Committee on Water Works," Minutes, 17 October 1870.

²⁶"Report of the Waterworks Committee," Minutes, 18 December 1861.

²⁷Minutes, 20 May 1869.

1870, and the lesson of the great Chicago fire of 1871 appear to have provided the final spur to a waterworks scheme. It was launched in March, 1872, under the direction of an elected board of water commissioners, an innovation borrowed from Hamilton. The scheme also incorporated, from Montreal, a "fire alarm telegraph" and the reorganization of the fire department. In June, 1872, planning for a "grand main sewer" as an adjunct to the waterworks was begun, and actual construction started in 1874, the year the waterworks began operating.

Many practical problems plagued waterworks construction, but a political one proved more central. The waterworks commission was perceived to be (and was) largely drawn from the anglo-protestant elite of the city. To ensure recognition of the sectional interests, so prominent in Ottawa politics, a largely Lower Town phalanx sought to eliminate the commission and bring the waterworks under the direct control of the council. Twice they failed--in 1875 and 1877--but ultimately succeeded in April of 1879.²⁸ Their control stayed. When questions of the adequacy or purity of the water supply emerged, they focussed directly on the local politicians, who were afforded neither the buffer nor the scapegoat of an independent commission.

At the outset, it was taken for granted that the Ottawa River source of the city's supply was pure. It was not that much of a concern in any case, since water in the 1870s and 1880s was not widely perceived as a carrier of disease. The chief problems with the waterworks well into the twentieth century had to do with excessive consumption and the related concern of sufficient pressure for fighting fires. Provision of additional pumps, and latterly--a crucial point to be noted--the provision of additional Ottawa River intakes near the pumping station for supply in emergency overcame most of these difficulties.

Though there was some concern in 1881 about the pollution of the source of the water supply, leading to a demand by the federal authorities for a filtered supply before they would contract for city

²⁸Minutes, 10 April 1879. City council informed that the province had passed the waterworks amendment bill.

water, nothing was done.²⁹ The city merely suggested the government put its own filters on. The main objection, in any case, was not to the possibility of disease, but to the taste and the color, the city's water being a brownish commodity, well-charged with vegetable matter.

The first critical intersection of the city's water supply and the city's health occurred in the typhoid epidemic of 1887 and its aftermath. The evolution of public health in the city is central to that discussion.

Threat of fire and the economic excesses of high insurance and the demands of water carriers provided an obvious spur to the development of a piped water supply. It also effected more directly the powerful and influential groups in the community. A good waterworks was also good public relations, a mark of a progressive and advancing city. Public health, however, produced no clear economic returns, in fact quite the contrary. Systematic sanitation--whether sewage, garbage or night soil removal--represented a heavy imposition on property. Many who owned property had private means to dispose of waste and to effect their own drainage and sanitation. As well, some of the devices to control infectious disease, such as quarantine, struck hard at business and was only barely tolerated. As well, disease was perceived as, and if the statistics of the 1880s are even reasonably accurate was, socially biased in its incidence.³⁰ In Ottawa, it struck hardest in the poorer wards of the city, ones which coincidentally, harbored the bulk of the politically weaker Roman Catholic (both French and Irish) populations. Finally, the etiology of disease was imperfectly understood until the last decades of the century, whereas the "etiology" of fire was. Prescription, for example in the form of waterworks, was easily perceived in the case of fire. In the case of disease, the influential miasmatic, anti-contagionist, or filth theory dictated prophylaxis, if public works were involved, in drainage primarily, to a lesser degree in sewerage, but not in a central way in water.

²⁹Water Works Committee, "Annual Report," Minutes, 5 December 1881.

³⁰See Table 2.

Table 2: Mortality by Ward, Nationality and Religion
Ottawa, 1885

	Deaths as Percentage of Total for Year ending 31 October 1885	Population as Percentage of Total for Census of 1881
<u>Wards</u>		
By	37.9	18.1
Ottawa	28.5	24.0
St. Georges	12.1	16.5
Wellington	18.5	30.6
Victoria	3.0	10.8
<u>Nationalities</u>		
French	43.0	34.2
Irish	28.9	35.0
English	20.6	17.9
Scotch	6.1	10.7
<u>Religions</u>		
Roman Catholic	75.2	58.0
Protestant	24.8	42.0

Sources: Mortuary Returns of the federal Department of Agriculture as printed in the Annual Report of the Medical Health Officer, Ottawa. And, Canada, Census of 1881.

Like most Canadian centres, Bytown/Ottawa had no permanent health establishment until the last quarter of the nineteenth century, part of the problem stemming from an absence of enabling legislation from the provincial authorities. Temporary, ad hoc boards of health emerged in time of epidemic in Bytown as elsewhere in 1832 and 1834, years of cholera epidemics. No public health measures whatever seem to have followed until the 1847 typhus epidemic when again temporary boards of health were established under a provincial statute passed in 1833.

In Bytown, the Board of Health established in 1847 turned into a political bear-pit, more engaged with a complaint by Anglican and

Presbyterian clergymen that the priests and nuns were proselytizing prostrate protestants in the embryonic Catholic General Hospital, than in the hundreds of Irish emigrants savaged by disease. Some 310 people, mostly Irish, died between June and August, 1847, from disease. Others, number unknown, died from "the most pinching want" and from exposure. Many had neither beds nor straw, reported The Packet, "...and we are told that poor creatures have expired on the cold ground for want of covering."³¹ As usual, the board was heavily biased in its membership toward the anglo-protestant, upper town community.³² Apart from some elementary cleansing measures, and, perhaps, a suggestion by one doctor on the board to "drive the Emigrants out of town" to prevent contamination of the healthy,³³ the board showed little imagination. It was disbanded in October, dumping the problems for the last six months of the epidemic back into the hands of the emigrant agent, G.R. Burke, who along with the Sisters of Charity had done most of the work anyway, and also into the lap of the first council of the newly-chartered town, itself gerrymandered to favor the Upper Town.

The experience of the typhus epidemic of 1847 and an apprehended cholera epidemic in 1849, prompted a new provincial health act in 1849. It was modelled on the 1833 legislation, and like it provided by order-in-council for temporary boards of health, in an emergency, at both the provincial and local levels. It also permitted municipalities to pass bylaws for elementary public health measures. But in Bytown, at any rate, threats of epidemic--for example cholera in 1849, 1850, 1854 and 1857--prompted, rather, the formation of "Sanatary" [sic] committees of council, and they, rather than boards of health, were the chief administrative instruments in the battle against disease. Their primary function was to

³¹September 25, 1847.

³²Only two of the sixteen members of the board were Irish Catholics, though most of the emigrants and perhaps forty per cent of the town were. It was, however, a familiar pattern in Bytown, replicated for example in the commission of peace and the militia.

³³The Packet, 4 September 1847.

make preparations to cleanse the town in Spring in anticipation of the summer or cholera season. These measures were carried out in Bytown/Ottawa by the High Bailiff under the direction, not of the "Sanatary" Committee, which seems to have had only a planning role, but the Streets and Improvements Committee. The High Bailiff used the Nuisance Bylaw as his legal instrument, not health legislation. It was a problematic device, at best, for though, as he pointed out in 1857, he had the majesty of the law behind him, council had failed to provide "suitable places for depositing the filth which has accumulated in the yards of the Citizens during the winter...."³⁴ Nor would city council provide such places for more than 30 years. Laws affecting public health in Ottawa often lacked a practical dimension and would languish without affective trappings.

There was, in fact, no statute to enable local government to make comprehensive bylaws respecting health or to provide the necessary officers and machinery to implement them. As close as Bytown council came to provision of a permanent facility in the early years was to build a cholera shed in 1854 on donated land, and to appoint two doctors as medical health officers to the "public" hospital. There were no cholera patients, "...but one man had been put into it with his neck broken, but not cured."³⁵ The building was ultimately sold to the man who had donated the land.

Special legislation to deal with special problems also did not work. Smallpox is a case in point. It was the only contagious disease in the period with a well-established specific for prevention, that is vaccination. As early as 1861, the provincial legislature passed an act to provide for the more general adoption of vaccination in cities, and under the terms of the legislation, Ottawa, in 1862, made provision for vaccination of the poor at public expense. Local doctors were appointed to act as public vaccinators in each ward.³⁶ But the effort largely failed, since it was voluntary, and lacked the continuing oversight, monitoring and

³⁴Minutes, 19 March 1855.

³⁵Ibid., 15 September 1862.

³⁶Ibid., 12 June 1865.

inspection of a permanent and independent health board or health officer. A good deal of public education was also necessary to gain acceptance of a procedure whose efficacy was proven statistically, but not established theoretically. It was also one that encountered strong resistance from anti-vaccination groups, and one that was subject to side-effects given the live vaccine, the septic procedures, and the crude instruments of the day.

The first attempt by Ottawa to provide continuing health machinery was in 1865 when a "Board of Health" was appointed to effect what had become an annual spring clean-up. With the new council of 1866, and cholera once again on the horizon, the "Board of Health" was promoted to the status of a standing committee.³⁷ The actions of both years were strictly speaking illegal, there being no statutory provision, and only in May, 1866, when the province invoked the 1849 health act, could a board of health, and then only one of the temporary variety, be established. Its term expired at the end of October. But in the same year, the provincial government also amended the Municipal Act to permit the establishment of permanent boards of health and the writing of health bylaws.³⁸ It marks the beginning of permanent structures of public health at the local level.

In Ottawa, a local board of health was struck at the beginning of 1867, and was given its operating framework with the passage on 22 June 1868 of the city's first health bylaw.³⁹

The bylaw was a comprehensive document of great strength in theory, but one, as it proved, desperately ineffective in practice. "The Board of Health" in Ottawa was a standing committee of council and composed of aldermen. It was to administer a bylaw that, among other things, provided for investigation and abatement of all nuisances and sources of disease, including quarantine of commercial traffic; stipulated procedures for reporting "malignant" diseases by both physicians and hotel or boarding house keepers; prohibited adulteration of foodstuffs and medicines, the

³⁷Ibid., 15 January 1866.

³⁸Province of Canada, Statutes, 1866, c. 51, s. 248.

³⁹Minutes, Bylaw 261.

pollution of water, and the sale of tainted flesh; contained provisions for control, inspection and licencing of slaughterhouses and butcher shops; set down measures for dealing with crowded dwellings where diseased or likely to cause disease; laid down requirements for drainage and regulation of privies, as well as for scavenging and removal of night soil, and control of animals; and, finally, it provided for inspection and enforcement by the Chief of Police and policemen acting as "Health Inspectors of the City." A schedule of penalties was enforceable in the police court of the city. There was no provision for a medical health officer.

In reality, the weaknesses were many, chief among them the dependence of the board of health on other city agencies and officers to implement health measures. The board had no staff of its own and little budget. The annual spring clean-up, perhaps the chief health measure of the middle decades, was carried out by the Streets and Improvements Committee (later the Board of Works), as were correction of deficiencies in the drains and sewers of the city, including by the 1870s residential hook-ups. Inspection, reporting and enforcement were only as good as the Police Commission--operating independently of city council--would make it, since the police were the health inspectors. The police commission, especially when pressed for money, was not that enthusiastic. For example, for most of 1872 the health committee agitated for the re-instatement of "Sergeant" McVettie, removed as health inspector in April of that year.⁴⁰ The police, in addition, were responsible for engaging contractors to remove night soil from the city.⁴¹

The presence of the federal authority provided its own problems. It, of course, was not obliged to recognize any other authority and only by protracted, and often angry negotiation could the city induce it to abate nuisances such as the canal Bywash. The Dominion government could not be hauled into the city's police court.

To some extent these problems were overcome in 1874 when the city,

⁴⁰See for example, Minutes, 8 April 1872 and 7 October 1872.

⁴¹Ibid., 7 April 1874. The police chief had contracted with three parties for the removal of night soil.

under provincial legislation of 1873,⁴² was able to appoint a doctor as health inspector, one by the end of 1874 entitled Medical Health Officer. Ottawa's first was Dr. James P. Lynn. He worked part time, as all the city's MHOs did until the second decade of the twentieth century. Nonetheless, Lynn formed the first element of a civic health department. From the time of his appointment, a much clearer appreciation of the health needs of the city emerges, not the least through a revealing series of annual reports.⁴³

In the main, this was the system, with amendments to the bylaw, that served the health needs of the city to the 1880s, and to a somewhat lesser extent, into the twentieth century.

But the medical health officer, like the high bailiff and the police chief before him, could only invoke the law. Enforcing it, or, more important obtaining budget and facilities from his political masters to make it work, often met apathy or outright resistance. The MHO could not coerce the local politicians, and often could not convince. They were more likely to listen to the vested interests in the town, like the slaughterhouse operators (supported by the numerous butchers) whose "offensive establishments" Lynn struggled in vain to bring under control. More positive support was to come from the provincial level.

In 1878, as a result of a threat of Yellow Fever in the United States, the Ontario Legislature struck a select committee on public health, chaired by Dr. Adam Crooks, MPP.⁴⁴ The committee's report was a sharp indictment of local health practices in the province:

...with the exception of passing by-laws and appointing committees on the public health, the municipal councils in general have not adopted or exercised any practical means for promoting the public health, or for removing filth, refuse, or other causes of injury.⁴⁵

⁴²"An Act Respecting Public Health," Statutes of Ontario, 36 Vic., c. 43.

⁴³The first of these published in the Minutes, 11 January 1875.

⁴⁴Adam Crooks, chairman, "Report of Select Committee on Public Health," 1 March 1878, Ontario, Sessional Papers, 1878, App. 2.

⁴⁵Ibid., p. 1.

The 200 doctors canvassed by the committee generally recommended that responsibility for health rest with the provincial government and be exercised through local boards. "A number [of doctors] mention that local officers appointed by Municipalities are too subject to local influences to act efficiently."⁴⁶

But the provincial government only acted on the report in 1882, and then only after an organized movement of Toronto physicians in 1881 pressured the government to establish a permanent provincial board of health. This was done under the public health act of 1882. This first board primarily had an advisory role and proved rather ineffective. The result was the tough Public Health Act of 1884, modelled on similar British legislation of 1875. Middleton claims it alarmed the conservatives in the province, for the legislature set up "...a Sanitary Autocracy and called upon the people to obey. Moral suasion had been tried without satisfactory effect...."⁴⁷ Local authorities, under orders of the central board, could now be compelled to enact measures and establish machinery for the protection of public health. Statistically, at any rate, there was a great deal of expansion in public health activity as a result of the legislation.

A series of amendments in the 1880s and 1890s stiffened the authority of the provincial board. Its sanction, for example, became mandatory for proposed sewer and waterworks. Expansion of civic health departments to include nuisance, food and other inspectors and specialists generally followed an extension of the provincial board's authority.

The 1884 legislation also attempted to deal with the problem of political influence. Under it, local boards of health were to consist of the mayor and eight ratepayers, a system that became effective in Ottawa in 1886,⁴⁸ just before a typhoid epidemic. The ratepayers proved no better than the politicians, and by the end of the decade boards of health were

⁴⁶Ibid., p. 2.

⁴⁷"Social Welfare in Ontario," in J.E. Middleton and Fred Landon, The Province of Ontario: A History, 1615-1927, Vol. I (Toronto: Dominion Publishing, 1927), p. 564.

⁴⁸Minutes, 15 February 1886, Bylaw 644.

once more drawn from city councils that were at least susceptible to the anger of the voter.⁴⁹

The provincial actions from 1878 to 1884 coincide with the scientific breakthroughs of Koch and others, which established the germ theory of disease. It seems unlikely that the 1882 act was built on this proposition, though it is possible that the 1884 act owed something to science. Middleton notes that of the four physicians on the seven-man board of health established by the act, all were contagionists with a belief in predisposing causes.⁵⁰ This would be in quite sharp contrast to attitudes displayed by the 200 physicians canvassed by the Crooks' committee in 1878, most of whom seem to have been miasmists with some belief in contagion.⁵¹ It would also be in sharp contrast to the anti-contagionist ideas that heavily influenced medical thinking and public health through much of the nineteenth century until the middle-1880s.

As noted, perhaps the dominant notion respecting disease was the miasmatic, anti-contagionist, or filth theory, that reached the peak of its influence in the 1870s with what one doctor later called the "sewer gas bogy."⁵² Many city councils, including that of Ottawa, spent a good deal of time and energy considering ways (none of them successful) of abating the vapours, believed to be deadly, from city sewers. Miasmists believed that disease spread without contact with existing cases, but was caused by miasmas which might be produced by atmospheric changes, vapour from the earth, or that arising from filth, stagnant water, sewer gas and the like. A relative minority of doctors were contagionists, or people

⁴⁹Ibid., 21 January 1889, Bylaw 893.

⁵⁰Middleton and Landon, Ontario, p. 564.

⁵¹Crooks, "Report of Select Committee on Public Health." Preventive measures recommended by the doctors were, for example: A supply of pure water and pure air by 34; better drainage and sewerage by 70; public education by 33; ventilation by 27; removal of filth by 24; ventilation of cellars by 8; isolation of persons with contagious diseases by 6; personal cleanliness by 7; removal of causes of intemperate habits by 5; the planting of trees by 2.

⁵²C.V. Chapin, "History of State and Municipal Control of Disease," in A Half Century of Public Health, op. cit., p. 141.

who believed disease was communicated from person to person.

Even at that the dichotomy was not uncomplicated. Great weight was also placed on predisposing causes, including mental and moral state. An epidemic might also be "...a scourge sent from the Almighty and having in it a voice calling loudly for humiliating and deep thought."⁵³ Disease was also variously related to a deficiency in atmospheric electricity or improper diet. As well, many miasmists did not rule out contagion as an additional cause, or contagionists, miasmatic influences.

The scientific conflict over the cause of disease had serious implications. Since, as Morris asserts, "...the choice between the two paradigms [of the miasmists and contagionists] could not be made from scientific rules, the choice was directed by social pressures from outside the medical community."⁵⁴ In Bytown/Ottawa, the scientific deadlock seems to have contributed more to apathy and indifference that made vaccination uneven, quarantine only partially effective, clean-up episodic, and permitted ethnic and political clash to dominate health questions. The reputation of the medical profession was also compromised by the contending science.⁵⁵ Quackery could flourish along with apathy.

In Ottawa, an important illustration of many problems affecting public health--both scientific and political--occurred as a result of the typhoid epidemic of 1887, when the city, and especially the medical health officer, had to deal with a crisis in the middle of the transition of scientific opinion.

As early as 1875, a year in which typhoid fever was the disease "most prevalent," the medical health officer, then James Lynn, noted the emerging opinion of "Eminent authorities" that typhoid "...does not rise spontaneously from filth or water made foul, but must be communicated by

⁵³The Globe, Toronto, 26 July 1849.

⁵⁴R.J. Morris, Cholera 1832, The Social Response to an Epidemic (London: Croom Helm, 1976), p. 180.

⁵⁵Geoffrey Bilson, "Canadian Doctors and the Cholera," Canadian Historical Association, Historical Papers, 1977, pp. 104-19.

the excreta of individuals affected."⁵⁶ He was clearly not convinced and remained pre-eminently a miasmist, asserting that despite learned opinion "...where drainage is imperfect, the exhalations from the drains naturally cause the spread of disease."⁵⁷ He also was a believer in pre-disposing causes. "Even admitting [the new typhoid] theory, filth and general inattention to details of cleanliness are the strong allies of disorder and disease, and so pre-dispose human systems, that on the appearance of the fever they more readily succumb."⁵⁸ Lynn, over the years, concentrated his assault on drainage and filth as a cause of disease. The city, by the end of the 1870s, he noted, had "...a supply of pure and wholesome water...." But, he went on, "abundance of pure water is a blessing to a community only so long as there exists a proper system of drainage. Pure air is as necessary to vitality as pure water, and it is impossible to have the former so long as stagnant water is allowed to remain in our midst."⁵⁹ Lynn's successor, Dr. Adolphe Robillard, appointed only after the usual Upper Town-Lower Town row, was of like mind. He tried charcoal filters in the city's manholes, and later, with the city engineer, suggested running sewer gases into private furnaces where the disease-producing vapours could be destroyed. By 1884 he was paying most attention to house drains, warning the citizens of Ottawa that "...defective drainage...is one of the most prolific causes of disease."⁶⁰ He urged connection to the near-completed public works. Despite some alarm, Robillard was generally optimistic about the city's health prospects. Given the topographical position of the city, "...its perfected subsidiary drainage and its plentiful

⁵⁶"Report of the Medical Health Officer," for the year ending 31 October 1875, Minutes, 17 January 1876, App. 2.

⁵⁷Ibid.

⁵⁸Ibid.

⁵⁹Ibid., for the year ending 31 October 1878, Minutes, 17 February 1879, Appendix.

⁶⁰Ibid., for the year ending 31 October 1884, Minutes, 1 December 1884, Appendix, p. 291.

supply of pure wholesome water, it is safe to assert that Ottawa must become one of the healthiest cities of the Dominion of Canada."⁶¹

In 1886, however, his prediction was confounded by a sharp rise in the death toll, some 208 higher than 1885. "This increased mortality," he argued, "is not always an exact test of the sanitary condition of a city.... It may be, as it was in our case, partly the result of influences not altogether controllable and partly due to legitimate causes." The prevalence of typhoid fever, was for example attributed "to a large extent" to "...atmospheric influences and to the upturning of the soil necessitated by the extensive subsidiary drainage and other sanitary works of improvement going on in every part of the city."⁶²

A year later, in 1887, the medical health officer and the city council were thrown into a complete state of confusion when in November a typhoid epidemic "such as Ottawa has never before experienced" struck "suddenly within a space of ten days overspreading the whole city." Some 1,500 cases were reported in Ottawa and the area for November, December and January, and 32 died in the first two months.⁶³

The epidemic clearly marked a turn in the thinking of city health officials about the cause of disease--or at least typhoid--and reveals much about the reluctance to abandon old perceptions, especially if it cost money.

In his report for the year ending 31 October 1887, but written during the first stages of the epidemic, the medical health officer was still attributing the few cases of typhoid fever in the early part of the year as "...probably owing to the peculiar meteorological state of the atmosphere which had prevailed since spring."⁶⁴ But by December of 1887, in a special report to the Board of Health, Robillard had clearly changed

⁶¹Ibid., for the year ending 31 October 1885, Minutes, 15 January 1886, pp. 419-20.

⁶²Ibid., for the year ending 30 October 1886, Minutes, 21 December 1886, Appendix, p. 417.

⁶³"Annual Report of the Medical Health Officer," for the year ending 31 October 1888, Minutes, 3 December 1888, p. 538.

⁶⁴Ibid., for the year ending 31 October 1887, Minutes, 19 December 1887, Appendix, p. 620.

his mind.

The medical health officer told the aldermen that neither the cause nor remedy for diseases such as typhoid and diphtheria are "definitely determined." One school, he said, argued that "...the decomposition of organic matter under favorable physical and meteorological conditions are capable of producing [such] diseases...." Another asserts, just as positively, that "...as regards Typhoid Fever at all events, no combination either of filth, fecal matter or sewer gas has ever yet been discovered that will produce the disease." This school believes it is "...caused by a peculiar specific poison...or germ..." and statistics show that 95 per cent of the cases of typhoid "...come directly from water."⁶⁵

Robillard went on to argue that the speed with which the epidemic spread convinced him "...that other fields must be explored..." for a more satisfactory explanation of the situation than meteorological activity or the condition of the sewers. Apparently working on the premise of the germ or contagion thesis, and noting the disagreeable taste and smell of the city's water supply, Robillard, accompanied by a Dr. Baptie, sought a solution in the pollution of the water supply, particularly in Rochesterville Creek, which wound its way through settled areas just west of the city boundary and entered the Ottawa River some 300 yards upstream from the inlet of the waterworks. There is, he wrote,

...abundant evidence even from its very source [Dow's Lake] that the waters in this creek are polluted with all sorts of offensive and dangerous matter from privies, pig pens, glue factory and slaughter house....⁶⁶

There is also, he added, the sewage from the residences along the route of the creek, and there alone is "...all the matter and conditions necessary for the contamination of the water used in this city." "...As clearly as circumstantial evidence can prove it...we have good reason to look upon this as [the] chief factor, if not the only one in the causation of the

⁶⁵Medical Health Officer to the Chairman and Members of the Local Board of Health, Minutes, 1 December 1887, p. 592.

⁶⁶Ibid., p. 593.

epidemic now prevailing in Ottawa."⁶⁷

His solution? Extend the clear water pipe for the city's supply to the middle of the Ottawa River, away from the source of pollution. He was seconded by the board of health, at this period made up of laymen, not politicians.⁶⁸

City council was not convinced. The evidence, by Robillard's admission, was circumstantial, and moreover contradicted a sewer-related --or miasmatic--disease theory only recently maintained by the health officer himself, and one from which he only excepted typhoid. The matter was turned over to the waterworks committee for investigation and the city solicitor for opinion. The latter simply suggested prosecuting the polluters to clear up the pollution.⁶⁹

The waterworks committee, for its part, sought analysis of the water, and on 23 January 1888 reported that samples were found "free from sewage pollution" but surcharged "to a dangerous extent with vegetable organic matter" that could be removed by boiling or filtration. They recommended against a new clear water pipe, but called upon the city engineer to make further investigations and to take soundings and prepare plans for a new intake.⁷⁰

The city engineer, Robert Surtees, produced the material in March, along with his own engineering and medical appraisal. He told the committee: "I entertain a great doubt about the present necessity or advisability of extending the clear water pipe further into the river...." He argued that several analyses of the city's water "prove there is no sewage pollution." And he questioned, at bottom, the health officer's thesis that the source of the disease was in the water supply.

⁶⁷Ibid.

⁶⁸Minutes, 5 December 1887, p. 574.

⁶⁹"Report No. 13 of the Water Works Committee," Minutes, 5 December 1887, p. 572.

⁷⁰"Report No. 1 of the Water Works Committee," Minutes, 23 January 1888, pp. 6-7.

I find that some leading authorities are of the opinion that the air we breathe is the first and most probable cause of infection, because we take very much more air into our lungs than we take water into our stomachs, and also because the lungs afford a better chance for the organisms to enter the blood...; moreover it is stated by experts, that the evidence which connects the disease with polluted water is purely circumstantial....⁷¹

He suggested, as a precaution that would embrace all scientific eventualities, to properly drain Rochesterville Creek (when it became part of the city), thereby satisfying the miasmists, to a point downstream from the clear water intake, thereby satisfying the contagionists. In the meantime, he suggested further monitoring of Ottawa River water and an investigation of systems of purification used elsewhere.⁷²

Council received the results of this second inquiry in April. Surtees and the chairman of the waterworks committee reported that a new clear water pipe extending to the middle of the river would cost at least \$⁰4,000, whereas a plant for precipitation, mechanical filtration and oxidation would cost about \$15,000 at current consumption. They recommended "...no further action be taken towards extending the clear water pipe...as it is quite evident if there is any impurity in the Ottawa water that it is not of local origin, but applies to the entire river...." Such diagnosis also made cleaning up Rochesterville Creek a redundancy. They added that if the ongoing monitoring program proves the water impure, then the filtration system be adopted as a curative.⁷³ It was the simplest and cheapest course.

In the face of the inquiries and with the end of the epidemic, the medical health officer climbed down somewhat. In his report for 1888,

⁷¹To the Chairman and Members of the Water Works Committee, "Report No. 5 of the Water Works Committee," Minutes, 3 April 1888, p. 68.

⁷²Ibid., pp. 68-9.

⁷³J.C. Roger, chairman, and Robert Surtees, engineer, to the Members of the Water Works Committee, "Report No. 6 of the Water Works Committee," Minutes, 20 April 1888, p. 112.

he reported water as the medium of typhoid in 85 (not 95) cases out of 100. He conceded that improper drainage or its absence was an important predisposing cause in a number of instances, and that "...protracted draughts and the evil effects of the usual condition of things created thereby, pre-dispose to and are often followed by Typhoid Fever..." but "...there were reasonable grounds to suspect that our water was an active agent in the distribution of this disease in the epidemic of last fall."⁷⁴

But he was not prepared to back down completely. Robillard refused to accept the results of the experts who provided a chemical, rather than a bacteriological analysis of city water. Such an analysis was about the best that could be done in Canada at the time, but as Robillard argued such analyses "...will not determine the presence or absence therein of specific germs...."⁷⁵ He even considered the chemical analyses as suspect, given their widely varying results, and continued to argue that one would be better convinced by the "surroundings of the inlet."

The problem of pure water in the 1880s was not solved by man or science, but by act of God. On 15 October 1889, the waterworks committee reported that the old wooden intake pipe had decayed beyond repair and would have to be replaced. It recommended that "...in order to leave no doubt about ensuring as pure a water supply as possible..." that a 40 inch clear water pipe, constructed of metal, be extended to the centre of the river.⁷⁶

For more than two decades there was little concern about the city's water, so far as disease was concerned, except for some inquietude about a rise in the incidence of typhoid at the turn of century, and about the possibility of pollution of the centre of the river from Aylmer, some miles upstream on the north bank of the river. But by and large, there were few

⁷⁴"Annual Report of the Medical Health Officer," for the year ending 31 October 1888, Minutes, 3 December 1888, p. 538.

⁷⁵Ibid., p. 540.

⁷⁶"Report No. 9 of the Water Works Committee," Minutes, 15 October 1889, p. 535. An Order-in-Council giving permission to lay the pipe was issued by the province 15 January 1890.

concerns about purity--though some about volume and consumption--until the events of the second decade of the twentieth century.

* * *

As the papers that follow illustrate, in the period between the 1880s, when effective measures for the control of both disease and fire were available, and the 1910s, it is quite remarkable how little Ottawa and its political leaders did, and how reluctantly and how tentatively they responded to major social problems of fire and disease.

A plausible explanation, with respect at least to disease, can be contrived for the period before the 1880s: a division of opinion in the medical and scientific community permitted the operation of external social, economic or political forces to determine or dictate public health measures, or, more often, ignore them. What is not clear, is why the attitude persisted. In Ottawa, it was, at times, almost as if Koch, anthrax and the provincial board of health had never happened, at least with respect to typhoid and the search for pure water. Typhoid and other contagious diseases, such as diphtheria, remained endemic and not much reduced in incidence from the 1870s. The long-term drop in mortality in the city,⁷⁷ seems to owe more to a drop in infant mortality, especially in the foundling homes,⁷⁸ and also, possibly, to better scavenging and sewerage as well as improved personal hygiene. The public sector remained Victorian. Examples apart from typhoid are numerous. For instance, in 1911, a typhoid year, the provincial medical health officer had to threaten

⁷⁷See Table 1.

⁷⁸From 1879 to 1883 of the 739 children received in Ottawa's one foundling home, 644 died, or about 85 per cent. By 1891 the percentage had dropped to 60 and by 1903 to 27. In 1882-3, the home registered 199 deaths. The total for the city (including stillborns) was 781. That is, the home alone accounted for a quarter of the city's mortality. In 1903, of 1198 deaths in Ottawa, the foundling home accounted for only 79. As well, infant mortality in general declined in the period.

to quarantine the city to get action from city council after a second outbreak of smallpox.⁷⁹

As for fire, the reason why the lumber piles did not go, is perhaps too obvious: the economic cost was too high; the social benefits deemed minor.

Ottawa, like other cities, was simply not run by a cadre of people who saw things in terms of a response to collective social welfare, the obvious notwithstanding. Nor were geographic, ethnic, religious or class groups sufficiently organized or powerful to demand from the councils of the day that they be not subject to the threat of disease and fire.

Who, then, prompted change? In Ottawa, at least, the presence and influence of what has become known as the social gossellers, or of organized labour is remarkably absent. It is almost as if the great social reform impulses of the late nineteenth and early twentieth centuries never happened in the city. Other answers seem indicated by these papers. Perhaps the motivating group was a rather narrow band of conservatives and of emerging professionals in health and other fields, a band of Rideau River Kerensky's. They were seconded by the people's press. One, finally, should not forget the fire insurance underwriters and the provincial medical health officers, who could use simple coercion when persuasion failed. As for the city fathers, one finds little to recommend in their inaction. But their focus, after all, was on the economic transformation of the turn of the century, not the social one. Public health, public housing, or zoning as a preventative in the public interest was pretty much an expensive sideshow. Both as politicians and businessmen their interests generally lay in the political economy of property. It did not often intersect with the collective welfare.

⁷⁹"Report Re Smallpox," 1 May 1911, in the "30th Annual Report of the Board of Health of Ontario for 1911," Sessional Papers, 1912, pp. 26-28