DISEASE, MORTALITY AND PUBLIC HEALTH, HAMILTON, 1900-1914

DISEASE, MORTALITY AND PUBLIC HEALTH, HAMILTON, ONTARIO, 1900-1914

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ABSTRACT

One of the recent concerns of social and medical historians has been the problem of public health reform as one of the many social reform movements characteristic of North American society, and urban society, in particular, in the late nineteenth and early twentieth centuries. The historiography of public health and its reform has focused on two issues. Medical historians, epidemiologists, and demographers have questioned whether specific social or ecological reforms have played any verifiable role in altering historical patterns of mortality in western society. On the other hand, social and urban historians have tended toward the assumption that urban reformers, and, more particularly, professionals in various fields were able, by improving social environments, to better the quality of urban life, as measured by many factors, including lower mortality rates. This thesis focuses on this conundrum and brings to bear on it two types of historical evidence drawn from the city of Hamilton, 1900-1914. Data are presented to describe the changes in general mortality rates and rates from specific causes, annually, 1900-1914. More traditional evidence is used to assess the impact of the activities of the Hamilton Department of Health, during the same time period, on the incidence of disease and mortality in the city.

After an extended examination of the historiographical issues involved, the thesis proceeds, in Chapter II, to an analysis of mortality patterns within the wider region of which Hamilton is a part. The evidence

supports the argument that urban mortality rates, particularly from contagious diseases and among infants, were generally higher than for the province as a whole, and that Hamilton's rates were at least as high as, or higher than, the average rates for urban Ontario. Chapter III then provides a detailed microanalysis of mortality patterns by ward and age cohort in Hamilton for 1910, a year in which an upward trend in mortality rates finally peaked. The analysis suggests that social and economic variables (housing density, occupation, assessed wealth) account for differential mortality rates within the city. With these data as background, Chapter IV traces the activities of Hamilton's Department of Health, and, in particular, of Dr. James Roberts who became M.H.O. in 1905. It is argued that in the absence of a broadly based reform movement in Hamilton, Roberts' actions and efforts, though not always successful, were particularly important, especially in terms of identifying for the public the ecological problems created by rapid industrialization and urbanization and manifested as threats to public health.

The thesis is intended as a contribution to urban history, the history of social reform in Canada, and especially as a contribution to the so far undeveloped area of public health as an object of historical inquiry in Canadian historical scholarship.

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CHAPTER I

INTRODUCTION

"Mortality tables," confessed the Treasurer of the Canadian Public Health Association, George Porter, in 1911, "[do] not make popular reading." Although reports in the daily papers of individual births, marriages and deaths were, he noted, read "at the breakfast tables for their personal interest, very few people ever think of wading through such returns when they embrace a whole country, province or nation."[1] Similar concern led George Whipple, respected American sanitarian and authority on typhoid fever, to propose that mortality statistics should be published in the local newspapers "with as much regularity as the records of the weather bureau, - not as headlines to appear only when there is an epidemic of some disease, but in such a way that the reader would come to look at these rates as a matter of course, and notice whether the figures were high or low." In this way, Whipple suggested, the public would learn to take pride in a low death rate and, on the other hand, to recognize an increase in mortality rates as an indicator of "something ... wrong that needs to be corrected." Statistics used to the best advantage would become a formidable weapon in the sanitarians' arsenal against disease and death.[2]

Mortality statistics were not a regular feature of daily newspapers in Canada in the early part of the twentieth century; but these data were of considerable concern to public officials in the province of

Ontario as evidenced by the wide variety of mortality statistics collected by the Registrar General's office from local registry offices and from medical health officers. Beginning in 1873, demographic statistics were published annually in the Sessional Papers of the province. The Registrar General noted changes in birth, marriage and death rates, but made little attempt to draw any inferences about the relative health of the people living in the province from the data provided for him. The interpretation of these statistics fell to the provincial Board of Health, and, at the local level, to the Medical Health Officers, who, in turn, made as much or as little use of the data as they judged necessary.

In chapters two and three of this thesis, these mortality statistics have been reconstructed for the province of Ontario, its urban centres and, in particular, for one city, Hamilton, during the period 1900-1914. These data support the subsequent analysis, in chapter four, of the health of Hamilton, a burgeoning industrial city, and of the response of public health officers in the city to the changes in mortality patterns during those years. The thesis argues that in the fifteen years immediately before the First World War, the health of the population of Hamilton as measured by general mortality rates and by the incidence of specific causes of death, not only failed to improve, but, in fact, deteriorated, in spite of the implementation of public health measures, the activities of a vigorous Medical Health Officer, and, more generally, contemporary advances in medical science and practice. Public indifference, demographic and environmental factors and, insofar as it can be documented, the social structure of the city, were all contributing factors to the apparent inadequacy of public health reform. In the end, however, it

would appear that in Hamilton, as in other places where the phenomenon has been studied, annual and long term fluctuations in the peoples' health were not especially amenable to short term, limited remedies. The advent of a golden age of public health in Hamilton awaited the coalescence, on a broad front and over a very long period of time, of a wide variety of ecological, social, medical, economic and political initiatives.

Historiography for the specific topic of the relationship of public health measures and levels of mortality is very limited for Canada and Ontario. The problem has, however, been approached by a variety of historians, demographers, economists and medical specialists, who have drawn upon British and American experiences. These studies provide not only the necessary background for this study of Hamilton, but serve also as a basis for comparison of the data drawn from Hamilton and Ontario. Moreover, these sources demonstrate that, in some areas, public health officials in the province and in Hamilton were either in the vanguard of public health reform movements, or aware of contemporary approaches to public health reform in the western world.

Gerald Grob, in an article published in 1977, suggests that the history of medicine, generally,and of disease, in particular, demands more attention than it has attracted in the past. Grob argues that disease, one of the most basic components of the human condition, plays a critical role in determining the size and structure of populations, and both influences and reflects the social structure of particular societies. Specifically, analyses of disease can point out possible relationships between the physical environment of a given area and the health of its residents. The responses by the population under study to particular

diseases are indicators, according to Grob, of the values underlying that society.[3] Grob emphasizes the need for studies of this "social response" to disease, that is, studies which will indicate whether attitudes toward particular diseases changed over time and which will address the question of why communities feared certain diseases and not others.[4] Vital as this work may be, Grob cautions against both the overuse of quantitative data and the exclusive reliance on such data. Statistics alone cannot explain the relationship between patterns of disease and social, economic, demographic, educational and geographic factors.[5]

Statisticians and demographers, such as Bernard Benjamin, agree that mortality levels vary with a number of factors: sex, age, environment, birthplace, occupation and marital conditions.[6] Although these observations were initially intended for demographers who interpret present day statistics, they are confirmed by the historical research completed by Thomas McKeown, R.G. Record and R.D. Turner on mortality in England and Wales from the eighteenth to the twentieth centuries. The most relevant aspect of these studies for this thesis is their analysis of the decline of mortality in the twentieth century, which is, first, an attempt to determine what factors might, or might not, have played a part in the decrease in mortality from any particular cause, and, second, to evaluate the contribution of the decrease in mortality from any one disease, or group of diseases, to the overall decrease in crude death rates in England and Wales, 1900-1971.[7] The authors conclude, in contradistinction to those who credit the medical profession with the largest role in the reduction of mortality, that the decline in mortality from air-borne infections (which includes tuberculosis) was the result of improved

nutrition, and that the decrease in mortality from water and food-borne infections was directly related to reduced exposure to bacteria, which was in turn, a result of improved hygiene. Immunization and therapy played a limited role in the reduction of mortality from other causes. Because the reduction in air-borne infections (which include tuberculosis) accounted for almost one-half of the total decrease in mortality during the years of the study, McKeown, Record and Turner identify improved nutrition as the greatest single factor contributing to the reduction in overall mortality, 1900-1971.[8] Interpretations such as this point out the value of undertaking similar studies in North America.

Further background for this thesis was provided by George Rosen's traditional study of the public health movement, A History of Public Health, which emphasizes the role, first, of the sanitarians, and later, of the more scientifically trained public health officers of the late nineteenth and early twentieth century in the improvement of the health of western countries. Rosen's analysis of mortality and disease in Victorian England is, however, of more value for this thesis. Rosen argues that in Victorian Britain there was a close connection between "ill-health, death, and the evil brood engendered by poverty," a link widely recognized by physicians and sanitarians of the day. Improvement in the health of Victorian urban dwellers resulted primarily, argues Rosen, from improved living standards among the poor.[9]

Statistical studies of mortality in the United States, 1850-1915, completed by Edward Meeker tend to bear out Rosen's conclusions. Meeker contends that, in the past, too much credit has been given to the medical profession as the agent of change in decreasing mortality in the United

States. In fact, the "most promising hypothesis" suggests that the improvement in the health of Americans was the result of better diet and housing, of sewers and water filtration and of new public health measures. The sanitation movement helped to compensate for the apparent adverse effects that urbanization had on mortality patterns.[10] The overall improvement in the health of urban dwellers, in particular, resulted, according to Meeker, from a decrease in the incidence of infectious diseases, a direct consequence of public health measures.[11]

Gretchen Condron and Eileen Crimmins-Gardner have examined the decline in mortality rates from specific causes of death in U.S. cities over a short period of time by comparing census data from 1890 and 1900. They have attempted (and failed by their own admission) to link decreases in mortality to specific public health measures. Their use of both descriptive and analytical data forces them to conclude that public health measures played only a limited role in the decline in urban mortality.[12]

No similar studies exist for Canada or Ontario. In 1934, a doctoral thesis by Mary Ross examined the decline in mortality from several specific causes in Ontario. The thesis was, however, merely a compilation of several articles which had been published previously in the Public Health Journal. The author's approach to the subject was that of an epidemiologist, stressing medical measures and changes in the nature of disease itself as factors in the decline of mortality from such causes as whooping cough, diphtheria, measles and scarlet fever.[13] However, because of its ramifications for other aspects of history, and especially on social history, the problem of disease, mortality and public health in general have been discussed in books bearing on other topics. Most

commonly, disease, mortality and public health are discussed in Canadian history, at least, in relation to that broader area of historical concern, the history of social reform and of working class culture.

Neil Sutherland, for example, in Children in English-Speaking Canada, a study of child-centered reform movements in the early twentieth century, devotes several chapters to infant and childhood health. Sutherland emphasizes, among other things, that aspect of the public health movement which concerned itself with the health of school children, a movement which, Sutherland argues, apparently had positive results.[14] Sutherland contends, in a similarly optimistic tone, that infant mortality declined dramatically throughout Canada from 1895 to 1920. The most striking proof of this decline, to cite Sutherland, "was that the downward trend has continued in an unbroken fashion ever since."[15] Sutherland takes no particular notice of the fact that in urban areas especially, there was relatively little improvement in infant survival rates before 1910 and that only after 1920 did the infant mortality rates remain consistently below 100 deaths per 1000 live births per year. This may be, in part, because Sutherland has relied heavily on journal articles of the day which often overestimated the effects of the public health campaigns in curbing infant mortality. Moreover, Sutherland has accepted without question the role of the clean milk campaign in reducing infant mortality. A study of statistics relating to the various components of infant mortality reveals that campaigns on the part of philanthropic organizations, in the years before 1914 at least, played a more limited role in reducing infant deaths than Sutherland assigns to them.

Terry Copp, in his study of working class Montreal, 1897-1929,

examines the health of the people "below the hill" as part of a wider survey of socio-economic conditions in the city. Copp attempts to explain why Montreal had such a bad record in the field of public health. He argues that what progressive measures were adopted by the city in the field of public health were aimed not at those who needed them the most. Rather, improvement came about, Copp suggests, "because health problems affected the entire society not just the working class."[16] Michael Piva paints an equally bleak portrait of the health of working class Toronto, 1900-1921. Piva argues that by 1920 public health reform had produced only limited results, in spite of active leadership and adequate funding. The movement failed because of the inability of civic and philanthropic groups to comprehend that poverty was the root cause of poor health among Toronto's working class.[17]

Paul Bator, in his unpublished doctoral dissertation outlining public health reform in Toronto, 1900-1930, is critical of the approach taken by Copp, Piva and others who, in Bator's opinion, have largely ignored the achievements of the reformers, dismissing them instead as "middle class meddlers".[18] In Toronto, Bator argues, public health reform was extremely successful, in part, because it enjoyed the combined support of voluntary organizations, private philanthropy and City Hall.[19] The progress of public health reform in the city was exemplified, Bator claims, by a thirty per cent reduction in mortality from 1910 to 1927.[20] Bator suggests that Toronto may have been exceptional in the matter of public health reform, and he ascribes this, in particular, to the city's middle class character as measured by homeownership. Curiously, the ratio of homeowners to tenants was higher in cities, Hamilton, for example, where

public health reform appears to have been less successful; and Bator presents no evidence in the form of general, age-specific and case mortality rates that would permit the reader to evaluate the legitimacy of his conclusions.[21]

Roy Lubove suggests that in the United States the accomplishments of housing reformers after 1900 were, in large measure, the result of their association with the public health movement. The fight against tuberculosis, in particular, "cemented the alliance between the health and housing movements."[22] Lubove argues too, that the fear of slums as a potential threat to the health and well-being of communities was a powerful motivating force in housing reform. In fact, the public housing movement was "sold" on the assumption that slum clearance and the substitution of minimally acceptable housing would remove a multiplicity of social evils. This thesis may demonstrate whether Lubove's observations about the relationship between health and housing reform are borne out in the case of Hamilton.

Like many recent historians, Lubove has accepted the widely-held thesis that planned social control by a relatively small group of individuals was an integral part of many urban reform programs.[23] However, overemphasizing the role of social control as the motivating force behind social reform is to be eschewed on at least two counts. The first is the caveat of William Muraskin who points out that the interest shown by social-control historians in the use of non-violent, manipulative measures, and especially the use of apparently progressive and humanitarian reforms, while liberating to traditional historical analysis, has its drawbacks, stemming as it does, from the cynicism of the 1970's. Muraskin,

on the other hand, argues that humanitarianism was a real force in the nineteenth and twentieth centuries and was even strengthened by the bourgeoisie's faith in its own ability to promote the public good. He contends that "because certain reforms are in the long-range interest of the middle class, because they help to rationalize and stabilize the social structure, to make the lower classes less unhappy or turbulent, does not prove they are not humanitarian. It only proves that "ideas" do not float in space but have roots in material or class interests."[24] Martin Wiener has even more serious reservations about the application of social control theories. He argues that there is danger in "a too-narrow interpretation of the process of social control as essentially one of manipulation of the mass by an elite in the interests of that elite." Social history, he contends, refuses to be "fit into the Procrustean bed of hegemony."[25] This perspective on social reform, in its Canadian context, is shared by Richard Allen who suggests that the success and failure of social reform can only fully be appreciated when "it is looked at as a religious manifestation, a striving to embed ultimate human goals in the social, economic and political order."[26]

It will, nevertheless, be necessary in this thesis to describe public health reform in relation to the idea of social control because so many of Canada's most prominent health officials linked their objectives to visions of race suicide and moral degeneration. Such fears seemed to call for the regenerative measures associated with the public health movement and appear to suggest that the movement was an integral part of what Christopher Lasch has termed "the drive to bring dangerous energies, social or sexual under control."[27]

The public health movement is also an important facet of urban reform. A comparison of health in one urban centre, Hamilton, with that in other cities, makes a contribution to a specific aspect of urban history. In particular, this study, relying as it does on newspaper accounts, reinforces Paul Rutherford's contention that newspapers like the Hamilton Herald which were "sensational in tone" were among the prime instruments of reform.[28] Rutherford suggests that there were ambivalent attitudes toward urban reform in Canada. On the one hand, urban growth was seen as the epitome of progress, but, on the other, a great deal of emphasis was placed on the adverse effects of urban living, one of which was disease.[29] Moreover, Rutherford notes both the extent to which the urban reform movement was dependent upon the moral and economic support of municipal governments, and the effect of persistent public apathy on the movement to transform the cities.[30] All these problems appear to some degree in this study of mortality and public health in Hamilton.

More specifically, Alan Artibise, in his study of urban development in Winnipeg, analyses the role of public health in that city 1874-1914. He emphasizes the apparent link between high levels of mortality and inadequate housing in Winnipeg. The slow evolution of an effective health department to handle the city's problems was, he suggests, the result of "the disparity that existed between the actual conditions and attitudes," that the urgent need for the application of remedial public health measures was not recognized by the governing commercial elite of the city. Instead, the immigrants who clustered in the city's northend were blamed for the high rates of disease and mortality.[31] As a result, the City Council, Artibise argues, "approached any and all public health matters in a

piecemeal and often callous fashion."[32] These ideas can be transferred effectively to the situation in Hamilton, 1900-1914. In sum, this thesis both draws from, and contributes to, a variety of historical fields. The studies cited above constitute only a portion of the corpus of historiographical literature that bears on the diffuse problem of public health reform movements.

The sources for this thesis are similarly diverse. Statistical data were collected from the Registrar General's reports, printed annually in the Ontario Sessional Papers. These reports provided both individual and aggregate data for Ontario, its urban centres and Hamilton. The use of such data was not, however, problem free. From time to time, classification of diseases changed, as, after 1905, when tuberculosis in some instances was grouped with communicable diseases. This precluded more specific analysis of the incidence of tuberculosis by specific age groups. As well, no age-specific breakdown of the population was available for this time period. Consequently, while crude death rates are accepted as an adequate indicator of general trends in mortality over time,[33] age-specific death rates would have provided a more incisive analysis of mortality in a period when the structure of the population may have been undergoing a transformation, as a result of immigration, natural increase and extended life spans.

Mortality statistics for Hamilton were available in reports compiled and published by the Medical Health Officer and his assistants after 1905; but, while the data were useful for comparisons, data from the Ontario Sessional Papers were used in statistical computations in order to preserve consistency throughout the study. Statistics for the

analysis of mortality in Hamilton in 1910 were drawn from records of individual deaths for that year.

The Ontario Sessional Papers were the source, as well, of the annual reports of the Ontario Board of Health. These reports are a compendium of information relating to public health and sanitation in the province during the preceding year. The reports include both essays and special papers prepared by board members on relevant issues and reports from the M.H.O.'s of cities and towns throughout the province detailing the state of health in their own preserves. The reports suffer from a lack of consistency. Local officials rarely sent in a report for every year in this study. Even Dr. James Roberts, a conscientious M.H.O., failed to submit detailed reports to the Ontario Board of Health for 1908 and 1909. Moreover, the reports themselves vary. Some included only the barest of statistics, while others, such as those from Ottawa, rehearsed at length the health problems of their cities. Nevertheless, the annual reports of the Ontario Board of Health provide a remarkable insight into the aims, special concerns and methods of public health officials throughout the province.

The reports issued in pamphlet form by the Hamilton Health Department after 1905 when Dr. James Roberts took office are another widely cited source in this thesis. Descriptive reports, complete with photographs to illustrate the grim conditions in the city, exist for many of the years from 1905 to 1914. Unfortunately, for some years, notably 1908 and 1909, only statistics were published by the Board of Health. But, in 1910, as if to compensate for the neglect, Dr. Roberts authored a lengthy and detailed report. It was, in fact, singled out by the

Public Health Journal as "creditable to Dr. Roberts and his colleagues, and ... should go far towards enlightening those in Hamilton who require enlightening regarding the importance of sanitation and preventive medicine."[34] City Council minutes for Hamilton provided some information about the finances and obligations of the Health Department and its officers. There are, regrettably, no personal papers extant for the Medical Health Officers in Hamilton during the period under study. The reconstruction of the activities of these officers is drawn almost exclusively from newspaper accounts and the reports of the Board of Health. Dr. Roberts' personality and the controversy it engendered made good newspaper copy. Consequently, the Hamilton Herald, at least, gave what appears to be quite full coverage to Dr. Roberts' more flamboyant ventures. But disease and mortality per se were not, as the introductory quotation to this chapter implies, matters of everyday concern to the people of Hamilton and weekly tallies of deaths from particular causes were not made public, even in times of epidemics of communicable diseases. Vivid accounts of violent deaths in the city were, however, front page news.

The Public Health Journal, which began publishing in 1910, was yet another useful source in the preparation of Chapter II which encompasses the broad area of health in the province of Ontario. Contemporary works on health and sanitation, although mostly of British and American origin, provided further material for the study.

The tables and statistics on disease and mortality in the province of Ontario, in urban Ontario and in Hamilton were computed using the statistical package for the social sciences (SPSS). No attempt has been made to generate statistics beyond the level of descriptive numbers,

essentially yearly averages or, more importantly, the ratio of deaths per 10,000 population, causes of death per 1000 deaths and the percentage of deaths attributable to specific causes by age groups, the measures normally applied in similar studies.[35]

The choice of the time period 1900-1914 for this study may require some justification. Initially, the relatively good data were the major factor in this choice. Further investigation confirmed this choice for a second reason. The period was not, as one might expect (and as it appears to have been in the United States) one of improving health for the people of Hamilton. Rather, during the opening years of the twentieth century, there was little change in mortality patterns in the city. Indeed, there is evidence of disimprovement. At least on the surface of things, these circumstances do not seem to conform with either the spirit or the fact of municipal improvement which has been the theme of much recent urban and social history of this period.

Before proceeding to analysis of the health of Hamilton, 1900-1914, it is essential to outline very briefly the background of the public health movement in both the province of Ontario and in Hamilton up to 1900. Until the 1880's the thrust of public health legislation in the province and in the municipalities was directed at the control of epidemics.[36] In 1882, a permanent provincial Board of Health was established and two years later, under the direction of the new board, the Public Health Act of Ontario was passed, modeled on the English Consolidated Public Health Act of 1875.[37] The Act authorized the Provincial Board of Health to make regulations for the prevention of disease and all matters related to it. It outlined the powers and responsibilities of local boards of health.

In accordance with the terms of the Act, local boards were required to provide special hospitals for infectious diseases, to enforce quarantines, to disinfect contaminated premises and to report all cases of smallpox, diphtheria, scarlet fever, cholera and typhoid within their jurisdiction to the Provincial Board of Health.[38] The local boards were made responsible as well for controlling all nuisances, and for food inspection to ensure that no meat or other edibles unfit for human consumption was sold. In 1895, the Provincial Board was given the authority to require that all plans for sewage disposal and water systems in the province be submitted for its approval.[39] By 1890, there were, in the province, 576 local boards of health and 356 appointed M.H.O.'s. In 1885, following a smallpox epidemic in Montreal which was controlled in Ontario by effective action by the Board of Health, a Vaccination Act was passed which further expanded the power of the local boards by granting them the right to enforce compulsory vaccination and, if necessary, to expropriate land for isolation hospitals.[40] In this same period, the first bacteriological laboratory in the province was opened in Toronto where, in accordance with the wishes of Peter Bryce, Secretary of the Ontario Board of Health since 1882, "practical application" might be made of recent bacteriological discoveries. In 1890, its first year of operation, however, the lab's activities were limited to the examination of 100 swabs for diphtheria.[41]

Because accurate collecting and recording of vital statistics was a measure of the efficiency of the Board of Health, the enactment of legislation in this area was critical for the progress of public health in the province. In 1869, Ontario passed an "act for the Registration of Births, Marriages and Deaths" whereby for a fee, municipal clerks registered

births, marriages and deaths.[42] Bryce, for one, stressed the importance of adequate reporting of disease and mortality statistics as a tool in the fight to control, in particular, communicable diseases. In 1883, the province was divided into ten districts for statistical purposes and physicians were requested to send weekly reports of the incidence of disease to the Board of Health. In 1896, the Consolidated Act was passed which required the registration of deaths before a burial certificate was issued. This improved the monthly reporting of deaths from communicable disease in the province.[43] Despite these measures, Bryce believed that the progress of public health in Ontario up to 1900 had been very slow.[44] Mortality statistics, unreliable as they might have been before 1900, tend to bear out Bryce's lament. The mortality rate of 11.1 per 1000 population for the province in 1890 was lower than the rate of 12.7 ten years later in 1900.

Hamilton had established a board of health and appointed a Medical Health Officer, Dr. Charles O'Reilly, to supervise public health in the city in 1873. His duties, in accordance with the first Public Health Act passed in the province in March, 1873, were associated chiefly with the control of contagious disease in the city and he was given the authority to remove to hospital those suffering from contagious diseases and to examine the occupants of any dwelling for the presence of diseases which might be dangerous to public health.[45] As early as 1880, the Board of Health for the city commented optimistically about the health of Hamiltonians, noting the prosperous conditions of industry in the city, which gave "employment to our working classes, and thus indirectly promoting [sic] health."[46]

In 1890, Hamilton had a mortality rate based on statistics from the Registrar General's Reports, stillbirths excluded, of 14.3 per 1000 population. Nearly one-third of these deaths were attributable to causes related to infancy and another 10 per cent to tuberculosis. Infant mortality claimed 194 of every 1000 babies born in the city. By 1895, the mortality rate per 1000 population had changed very little at 14.1, while infant mortality remained high at 185 per 1000 live births. What hospital records there are for this period highlight, as Bryan Palmer points out, the poor health of Hamilton's workers who suffered from a wide variety of untreatable diseases.[47] At the turn of the century, Isaac Ryall, who had been M.H.O. since 1876, was concerned, as were other public health officials throughout the province, to report cases of contagious diseases. His reports consisted, for the most part, of chronicling the deaths from such diseases. Unlike his British and American counterparts, Dr. Ryall showed very little awareness of "the impact of an unregulated urban environment upon the working class."[48]

Hamilton was, in 1900, a thriving industrial city of about 50,000. By the eve of the First World War, immigration, natural increase and a flood of workers had swelled the population to slightly more than 100,000. This rapid growth, accompanied as it was by spells of economic recession, left in its wake a multitude of social problems, many of which fell within the precinct of the health department. Physically, the city was, in 1900, as it had been twenty years earlier, characterized by "residential segregation."[49] By 1900, the industrial workers were concentrated in the city's north end, an area on low land adjacent to the bay and to heavy industry and criss-crossed by railway lines. The more prosperous citizens

lived in the southern part of the city close to the base of the Mountain. Assessed values for the period under study indicate that the already crowded areas, especially in the east end, became increasingly over-populated and remained unimproved during these years.[50]

Under the circumstances, the health department's job was not made easy in the years before World War I. An analysis of mortality statistics reveals that in Hamilton, as in other urban centres of Ontario, the incidence of mortality, and especially from some specific causes, notably diseases related to infancy and communicable diseases, rather than decreasing, rose from 1900 to 1910. Only after 1912 was there an overall marked improvement in mortality patterns, and, by inference, in the health of the citizens of Hamilton. In an age where neither the federal or provincial governments nor the municipality was willing or able to adopt adequate measures to ensure the physical well being of its citizens, the people of Hamilton, like the inhabitants of Seebohm Rowntree's York, needed nothing more than a common debilitating illness such as tuberculosis to bring a family to the edge of personal disaster. That part of this thesis which discusses the problem of the geographic patterns of mortality in Hamilton as charted by a specific reconstruction of mortality in the city for 1910 tends to bear out the relationship between socio-economic factors and mortality.

This thesis is an attempt using both statistics and contemporary reports and opinion to determine whether in the period 1900-1914 there was any discernible improvement in the health of the people of Hamilton, compatible with the optimistic reports emanating from civic officials. It asks whether apparent improvements, as reflected in lowered mortality,

were distributed evenly throughout the city and the population. Moreover, it poses the question of whether decreases in mortality from certain diseases can be explained in terms of the measures applied by the city's health department.

It appears that the quality of health in Hamilton, 1900-1914, was the consequence of a variety of factors; social, economic, medical, demographic and environmental, some of which quite obviously fell within the domain of the city's health department. Other factors, whether by deliberate choice or through ignorance, were overlooked by the department and city officials alike. Many of those aspects of public health which did improve and most of those that did not appear, in retrospect, to have defied the remedial action taken by the health department. But this may simply be another way of underlining the extent to which measurable improvements in public health result from the contributions over a very long period of time of many specific reforms. The historian may rarely be able to isolate the short term effects of limited action.

FOOTNOTES

[1] G.D. Porter, "Tuberculosis Mortality in Ontario," Public Health Journal, II (March, 1911), 111.

[2] George Whipple, "The Uses of Vital Statistics in the Public Health Service," Public Health Journal, IV (June, 1913), 353.

[3] Gerald Grob, "The Social History of Medicine and Disease in America: Problems and Possibilities," Journal of Social History, 10 (June, 1977), 396.

[4] Ibid., 399.

[5] Ibid.

[6] Bernard Benjamin, Demographic Analysis (New York, 1969), p. 75.

[7] Thomas McKeown, R.G. Record and R.D. Turner, "An Interpretation of the Decline of Mortality in England and Wales During the Twentieth Century," Population Studies, 29 (3, 1975), 390-391.

[8] Ibid., 421-422.

[9] George Rosen, "Disease, Debility and Death," in H.J. Dyos and Michael Wolff, eds., The Victorian City. Images and Realities, Volume 2, (London, 1973), pp. 626, 659.

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CHAPTER II

DISEASE AND MORTALITY I: The Regional Background, 1900-1914

In this chapter, general mortality rates and rates of mortality from specific categories of illness in the province of Ontario, 1900-1914, and in its principal urban centres, provide the focus for a comparative analysis of patterns of mortality. This discussion, in turn, provides the background necessary for an analysis of mortality in the city of Hamilton, 1900-1914, the subject of the next chapter. Generally, the data lend themselves to the conclusion that until 1910 mortality throughout the region increased, with the highest incidence of mortality recorded in the urban areas. By 1914, however, mortality rates had decreased and approached the levels of the years 1900 to 1904. Throughout the province and in Hamilton, as well, public health officials attempted to reduce mortality rates by tackling those areas which on the basis of past experience seemed to be most amenable to human intervention. Their measures ranged from strict enforcement of quarantine and vaccination procedures to campaigns to regulate the milk supply in order to reduce infant mortality. Sometimes they were successful; frequently they were not. Success or failure appears to have depended as much upon factors beyond their control as on their ministrations. Through all of this, public attitudes, varying from outright fear during epidemics to general apathy when the threat to life subsided, determined how, when, and what preventive measures would be applied.

In this analysis of mortality, twenty-six classifications for the cause of death were devised. Some categories are composed of a single readily identifiable disease such as smallpox, typhoid or diphtheria; other encompass the much broader categories of circulatory, nervous and digestive diseases and old age. These categories approximate those defined in the abridged version of the International Classification (Bertillon Nomenclature) of causes of death which arranged diseases according to their site in the body.[1] This abridged classification was adopted in 1906 by the Ontario Board of Health in the preparation of its annual reports and, in a less complicated form, was used by the Medical Health Officers for the city of Hamilton in their annual reports in the years, 1900-1914. Stillbirths have been included in the calculation of total mortality because, in Ontario, where the registration of births and deaths was required by law after 1869, stillbirths were registered as both births and deaths.[2] Until 1911, stillbirths were included by the Provincial Board of Health in the calculation of the general rates of mortality in the province. Stillbirths have been utilized throughout this study to provide consistency and because they may be sensitive to social, economic and demographic change.[3]

The first official concern over the difference between rural and urban mortality in Ontario seems to have occurred in 1903. A brief statement in the Registrar General's Report for that year pointed out that while higher urban mortality might be the result of more accurate reporting of deaths than in rural areas, another explanation could be simply the increased health risk of living in cities.[4] Statistics indicate that this dichotomy had existed in 1900 and likely before.

TABLE 1

ANNUAL MORTALITY RATES PER 1000 POPULATION, 1900-1914

YEAR	ONTARIO	URBAN AREAS
1900	12.7	17.0
1901	13.6	17.0
1902	12.6	15.8
1903	13.5	17.4
1904	14.2	17.6
1905	14.2	17.4
1906	14.8	17.4
1907	15.1	19.3
1908	14.7	20.0
1909	14.6	19.1
1910	15.0	20.8
1911	13.6	19.1
1912	13.5	15.8
1913	13.8	16.0
1914	12.8	14.1
AVERAGE	13.9	17.4

Source: OSP, REG. GEN. REPORTS 1900-1914

For example, in 1900, in every state of the U.S., urban death rates exceeded those in rural areas.[5] An analysis of similar data for Ontario indicates a parallel pattern throughout the years 1900-1914.

In 1900, Ontario had a mortality rate of 12.7 per thousand population, while the urban centres, that is, all cities over 10,000 (which included Toronto, Ottawa, Hamilton, Kingston and London) a rate of 17.0. Fifteen years later the respective mortality rates, 12.8 and 14.1 per 1,000 population, had moved closer together, the result of an improvement in urban mortality rates (See Table 1). These isolated data obscure the annual fluctuations characteristic of mortality rates in both the region as a whole and its cities and the broad patterns of death from specific causes of mortality. For example, in the years 1908 to 1911, urban death rates were as much as one-third higher than provincial rates. On the other hand, both the regional death rate and the urban death rate increased in these years, just as both declined after 1912. This could suggest that in both instances urban mortality rates, a consequence of rapid urban development, "drove" the rates for the province as a whole. What follows is an examination of some of the categories of specific diseases which contributed to mortality rates 1900-1914 and a study of the response of public health officials, at the provincial and the municipal level, to the rising mortality rates in the first years of the twentieth century.

In 1900, infant mortality was the largest single category of death. Stillbirths, malformations, premature births and diseases such as cholera infantum which in summer reached almost epidemic proportions in those under one year accounted for 111.8 deaths per 1000 deaths

throughout the province and for 123.9 in urban centres. The infant mortality rate soars even higher when deaths from all causes for those who did not reach their first birthday are included. Yet, in 1900 "the long line of white hearses which deposit[ed] their tiny contents in the cemeteries"[6] were not the matter of great public concern which infant mortality would become by the end of the decade. Rather, in the opening years of the century, public health officials at all levels focused most of their attention on the persistent and familiar problems of smallpox, diphtheria, typhoid fever and tuberculosis,all communicable diseases the causes of which were by then at least partially understood. In the cases of smallpox and diphtheria, methods of prevention or cure had been developed by the last decades of the nineteenth century.

In his annual address in 1900, T.E. Vaux, the chairman of the Ontario Board of Health, singled out tuberculosis as perhaps the most pressing of the Board's concerns.[7] The members of the Board, he observed, could not have forgotten "their long and continual efforts for many years to keep this disease in its many phases before the attention of the public."[8] Despite these attempts to publicize the most recent medical opinion about the causes and cures of tuberculosis, there had been an increase in mortality from the disease in all its forms in both 1899 and 1900. In fact, mortality from tuberculosis appears to have reached its peak in 1900. Vaux warned the Board that the public had "become greatly agitated over this matter, and from all classes of the community the cry comes: What can be done to save our loved ones from the terrible scourge?"[9] This fear of tuberculosis was quite justified. Tuberculosis accounted in 1900 for 118.1 deaths per thousand for the province as a

TABLE 2

MORTALITY RATES PER 100,000 POPULATION FOR SELECTED CATEGORIES OF DISEASE 1900

	AVERAGE OF 26 U.S. CITIES	URBAN ONTARIO
DIPHTHERIA	59.2	58.7
WHOOPING COUGH	13.2	7.6
TYPHOID FEVER	33.8	32.6
PNEUMONIA-RESPIRATORY	241.7	185.0
TUBERCULOSIS	218.1	227.5
DYSENTERY-CHOLERA INFANTUM	153.1	202.2
CANCER	65.8	69.2
CIRCULATORY	134.1	120.1
NERVOUS	206.2	220.5
URINARY	120.0	57.0
OLD AGE	45.7	114.9
TOTAL	1290.9	1295.3

Sources: G. Condron & E. Crimmins-Gardner, "Public Health Measures and Mortality in U.S. Cities in the Late Nineteenth Century, "Human Ecology, 6 (1978).

OSP, 1900. REG. GEN. REPORT.

whole and for 133.9 per thousand deaths in urban areas. Moreover, in the age group 15 to 30,which was most susceptible to the potentially fatal ailment, about one in three deaths was attributable to tuberculosis.

Tuberculosis, or "the white Plague" as it was often labelled, is an endemic disease whose victims are primarily those with lowered resistance.[10] It flourished in urban environments where overcrowding, poor nutrition, substandard working conditions and careless health habits abounded. Although the tuberculosis bacillus had been isolated by Koch in 1882, twenty years later there were no effective measures to combat the disease. Furthermore, in spite of the wide acceptance of the germ theory many doctors in North America still argued that heredity was the means of transmission of the disease.[11] The tubercle bacillus invades the body in a variety of ways. Normally, the source of infection derives from the sputum of an infected person and spreads by droplet infection through the air or by the use of contaminated utensils. The bacilli can exist for several months in dried sputum and can be transmitted in contaminated milk.[12] Initially, tuberculosis produces no symptoms, but as the disease progresses, fatigue, night sweats and fever develop so that regular work becomes impossible for the victim. More than being a severely debilitating and often fatal disease, tuberculosis carried with it a cruel social stigma because of the conditions under which it appeared to thrive. Moreover, as a result of the disgrace attached to it, tuberculosis did not become a reportable disease in Ontario until 1912.[13] Some municipalities, including Hamilton, made reporting mandatory somewhat earlier. It is, however, likely that many deaths from tuberculosis in Ontario were deliberately reported as respiratory ailments such as pneumonia, while

others were not properly identified through misdiagnosis. Consequently, the number of reported deaths from tuberculosis was probably lower than the actual numbers occurring.

Mortality from tuberculosis was at its height in Ontario in 1900 with 3,484 deaths attributed to the disease in all its forms. In spite of population growth, the number of deaths from tuberculosis after 1901 did not again exceed 3000. However, of more value for comparative purposes are the numbers of deaths per 1000 deaths and per 10,000 population occurring from tuberculosis. The death rate per 1000 deaths from tuberculosis declined continuously from a high of 118.1 per 1000 deaths, or 1 in 10 deaths, in 1900, to a rate of 66.5, or 1 in 20 deaths, by 1914. Similarly the mortality per 1000 deaths from tuberculosis dropped to 61.2 in urban areas of the province, (133.9 per 1,000 deaths in 1900, 88.9 in 1904 and 95.5 in 1906) although the decrease slowed down after 1907. The death rate per 10,000 population from tuberculosis for the urban areas of the province decreased in a similar manner. (see Tables 3 and 3a) Whereas in 1900, 22.7 deaths per 10,000 population resulted from tuberculosis, by 1909, the rate had fallen to 13.5 and to 8.7, one-third of the earlier rate, by 1914. The few comparative figures that are available from other studies indicate that the urban rates, at least, were slightly in excess of those for cities in the northern United States in 1900. Condron and Crimmins-Gardner have recorded mortality rates of 19.2, 22.0 and 19.3 per 10,000 of population from tuberculosis in the urban areas of Connecticut, New York and Massachusetts respectively.[14] Mortality rates per 10,000 population recorded for the province were lower than urban rates, declining from 14.9 per 10,000 in 1900 to about half that, 8.5, by 1914.

TABLE 3

ANNUAL MORTALITY RATES FOR TUBERCULOSIS AND TYPHOID FEVER / 1000 DEATHS

	TUBERCULOSIS			TYPHOID FEVER		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	118.1	133.9	133.3	23.1	19.2	19.8
1901	109.5	122.8	117.3	16.9	14.2	12.3
1902	96.7	105.3	113.5	14.1	11.9	12.9
1903	91.8	96.2	73.9	13.2	11.8	4.9
1904	91.9	88.9	108.3	15.4	16.7	9.7
1905	85.0	81.1	81.0	14.2	13.0	13.5
1906	88.8	95.5	100.5	27.2	20.2	20.8
1907	75.4	72.5	58.2	15.5	16.9	7.3
1908	76.6	71.5	77.5	20.2	18.9	12.4
1909	72.9	70.8	93.0	20.6	18.0	10.9
1910	68.3	62.5	69.8	21.1	24.8	9.5
1911	68.5	55.0	58.8	18.6	18.7	14.9
1912	64.8	59.0	68.1	13.9	17.6	5.6
1913	62.0	55.1	66.4	12.1	10.8	9.4
1914	66.5	61.2	70.8	10.2	8.7	5.4
AVERAGE	82.5	82.7	86.0	17.1	16.1	11.3

Source: OSP, 1900-1914. REG. GEN. REPORTS.

TABLE 3a

ANNUAL MORTALITY RATES FOR TUBERCULOSIS AND TYPHOID FEVER / 10,000 POPULATION

	TUBERCULOSIS			TYPHOID FEVER		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	15.0	22.7	20.5	2.9	3.3	3.0
1901	14.8	20.9	18.0	2.3	2.4	1.9
1902	12.2	18.6	16.6	1.8	1.9	1.9
1903	12.3	16.7	11.3	1.8	2.0	.8
1904	13.1	15.7	18.8	2.2	2.9	1.7
1905	12.1	14.1	14.4	2.0	2.3	2.4
1906	13.1	16.7	16.9	4.0	3.5	3.4
1907	11.3	14.0	10.2	2.3	3.3	1.3
1908	11.2	14.3	14.6	3.0	3.8	2.3
1909	10.7	13.5	16.9	3.0	3.4	2.0
1910	10.2	13.0	14.4	3.2	5.1	2.0
1911	9.3	10.5	8.7	2.5	3.6	2.2
1912	8.7	9.3	9.2	1.9	2.8	.8
1913	8.6	8.8	9.1	1.7	1.7	1.3
1914	8.5	8.7	9.1	1.3	1.2	.7
AVERAGE	11.4	14.4	13.9	2.4	2.9	1.8

Source: OSP, 1900-1914. REG. GEN. REPORTS.

Clearly urban dwellers in Ontario reaped the most benefit from the decrease in tuberculosis mortality. The reasons for this decline are not clear and provoke controversy. Health officials of the day attributed it to the sanatorium movement, even though very few tuberculosis victims were patients in the province's sanatoriums, and to the early diagnosis of the disease. Visiting nurses and campaigns to educate the public about the ways in which tuberculosis spread were also cited by the Ontario Board of Health as having played significant roles in the amelioration of the disease. Public health officials throughout the province rejoiced at the benefit to the economy from both the increased productivity as the result of lower mortality among the employable and from decreased public expenditure on tuberculosis patients. Recent opinion does not support the explanations of public health officials of the day for the decrease in tuberculosis mortality. McKeown, Record and Turner, writing about declining mortality in Britain in the twentieth century, argue that effective treatment for tuberculosis dates only from the use of chemotherapy beginning in 1949 and from the introduction of vaccine in 1954. In Britain, two-thirds of the reduction in tuberculosis mortality took place before 1947, and was part of a long term decline in the disease from the time it was first registered as a cause of death. Consequently, they maintain that even without the intervention of new therapeutic measures to combat the disease, the death rate from tuberculosis would have continued to decline. Nor was reduced exposure to tuberculosis as a result of the segregation of those who were infected a major factor in the decline. Rather, they contend, improved nutrition, and to a lesser extent, improved housing were the causative

forces contributing to the decrease in mortality from tuberculosis before the use of chemotherapy.[15]

Public health officials in Ontario were aware that after 1900 mortality from tuberculosis was declining. So sensitive were they about the high incidence of tuberculosis and so eager were they for improvement that even a slight increase in mortality, such as the .7 per 10,000 per population increase from 1903 to 1904, prompted an immediate response. E.E. Kitchen, Chairman of the Board of Health at the time, immediately recommended that tuberculosis "should receive notification." Houses need not be placarded, but the Secretary of the local Board of Health should be informed of all cases "so that information and other assistance might be given to the family, in order to avoid contagion, etc."[16] In 1904, a committee was established by the provincial Board of Health to investigate both tuberculosis and typhoid in Ontario. The committee members, J.J. Cassidy, William Oldright and C.A. Hodgetts, drafted a leaflet containing, among other things, "personal and general precautions suitable to prevent the spread of consumption."[18] The pamphlet recognized the theory that microbes invaded the victim's system primarily through inhalation. Thus, precautionary measures were directed at curtailing expectoration, especially by known consumptives who were warned not to "expectorate anywhere except in a spitoon kept for the purposes, which ... should contain water to which a disinfectant has been added, preferably a 5 per cent solution of carbolic acid." Nor should "a room occupied by a consumptive .. be swept or dusted." In addition to a long list of personal precautions for patients, the report outlined procedures that the general public should follow to reduce their risk of contracting tuberculosis. Some recommendations

such as those which advised keeping rooms clean and heating meat and milk to 180 degrees could be implemented by most families without great difficulty. Other warnings against the dangers inherent in poorly ventilated, overcrowded homes and factories were, for those who lived in congested urban areas, totally impracticable.[18]

In his dual capacity as Deputy Registrar General and Chief Health Officer of Ontario, Charles Hodgetts attributed the rise in mortality from tuberculosis to an increase in returns and not to any resurgence of the disease itself. He argued that the drop of about 600 deaths from 1902 to 1903 was not accurate. It was merely an indication of popular attitudes toward the disease, that "the meagre knowledge acquired by the public regarding consumption [had] caused many to consider it a personal and family reflection that a person is affected with the disease." It was not, he concluded, "fashionable" and, indeed, it was for some "a disgrace to suffer from, leave alone die of, this contageous disease." Subsequently, the deaths from tuberculosis were deliberately attributed to other less contemptible causes. To those who boasted of the "good work done on behalf of the consumptives of [Ontario]," Hodgetts replied that the result in terms of prevention of deaths was not yet appreciable and it was the duty of municipalities by establishing sanatoria, day camps and home nursing programmes to work to ensure results.[19]

Peter Bryce, who had been associated with the Ontario Board of Health since its inception in 1882, viewed tuberculosis within a much broader context. A self-proclaimed reformer, Bryce recognized the link between high mortality from tuberculosis and urban industrialized societies where the "individual [is] almost lost in the complex interests and duties

which his environment forces upon him."[20] And, applying as he often did, the doctrine of utilitarianism borrowed from Jeremy Bentham, "the good old philosopher", Bryce argued that immunity from tuberculosis depended "upon the degree to which the plane of existence of society as a whole becomes such as to make common endeavour against it a matter of everyday concern."[21] Moreover, the disease could not be thought of as merely "an individual and family misfortune," but must be accepted as a social and economic evil. As such, according to Bruce, tuberculosis prevention and cure fell within the area once reserved only for moral and religious concerns, and the duty to reduce mortality from tuberculosis rested equally upon the "physician, clergyman and philanthropist."[22]

The provincial Board of Health continued to express concern over the high mortality from tuberculosis throughout the period under study and the slightest decrease in the mortality rate was a source of personal satisfaction and pride to public health officials. Whether officials were genuinely distressed at the loss of life, particularly in the labour productive 20 to 45 age group, or whether their concern resulted from the stigma attached to the disease as an indicator of adverse social conditions is not clear. Public interest in tuberculosis was kept alive and fueled by racial prejudice directed against recent immigrants who were suspected of spreading the disease. Official opinion tended to reflect these same attitudes. According to the Registrar General's report of 1913, many recent arrivals were "... of that class of Europeans who love to cluster in small spaces and live in conditions impossible to the Anglo-Saxon, conditions which are the most favourable to the propagation of [tuberculosis]."[23] In fact, of 402,432 immigrants for the year 1912-13,

only 62, or 1 in 6,500, were deported as consumptives.[24] If there was a higher incidence of tuberculosis among the foreign born, it was not attributable to their foreign birth, but, rather, to the circumstances in which most immigrants lived in urban Ontario.

In 1912 an amended Public Health Act was passed by the Provincial government. The act included a redefinition of the communicable diseases which were to be reported to the M.H.O. or to the local boards of health. Tuberculosis, along with mumps, measles, anthrax and poliomyelitis, was added to the list of those already specified in the Infectious Diseases Act as requiring notification.[25] In the same year, provincial aid was granted to indigent patients in sanatoria, a measure which was confirmed by law in 1913.[26] But statistics do not point to an immediate and dramatic improvement in tuberculosis mortality as a result of government intervention. Deaths from tuberculosis declined more slowly after 1908 in spite of the growth of the sanatorium movement. The measured decrease from 1900 to 1914 seems generally to conform to McKeown, Record and Turner's theories about the nature of tuberculosis mortality. For the next two decades tuberculosis continued to pose a considerable health problem for both the general public and health officials alike. Only an analysis of tuberculosis mortality over a wider time span will confirm or disprove the assumptions of public health workers of the day that their palliative measures were the operative force in reducing mortality from the disease in Ontario.

Like tuberculosis, the incidence of typhoid fever was interpreted almost universally as a reliable indicator of the sanitary conditions of the area in question. Public health officials in Ontario agreed with the pronouncement of Dr. Hutchinson, M.H.O. for London, Ontario, that "typhoid

fever, essentially a filth disease, may be taken as a gauge of the sanitary condition of a municipality."[27] Because they believed a high incidence of typhoid fever was indicative of inadequate and careless sanitation, provincial and municipal health officers alike persisted in their efforts to eradicate typhoid fever, even when the mortality from typhoid was much lower than for many other communicable diseases. Experience obviously had taught them that it was within their power to control typhoid.

Typhoid fever is an acute infectious disease, caused by the typohoid bacillus, salmonella typhosa. The source of this infection had been uncovered in 1880 by K.J. Eberth, and in 1884, the bacillus was formally designated as the causative factor in the spread of typhoid fever. The disease can be spread by water, milk or solid food which has been contaminated by the feces of typhoid victims or, less frequently, of healthy persons who may, like the notorious Typhoid Mary, lack symptoms, but carry the bacillus. Typhoid, an intestinal infection, becomes localized in the lymphatic tissue and spreads from there to the blood stream. Complications such as pneumonia or perforation of the intestine occur in 10 to 30 percent of the cases, and, as a result, the cause of death in these cases may be falsely attributed to the secondary infection. Not until the 1950's and the introduction of such drugs as chloromycetin was there an effective cure for typhoid fever.[28] By this time, the disease was almost nonexistent in urban communities.

There is little debate about the reasons for the decrease in mortality from typhoid fever in western countries since the mid-nineteenth century. McKeown, Record and Turner, among others, are convinced that water purification and filtration systems, better sewage removal and

treatment and more sanitary food handling all had, by the end of the nineteenth century, contributed to the reduction in typhoid mortality throughout the Western world.[29] However, during the early years of the twentieth century in Ontario conditions in many parts of the province were still quite conducive to the spread of typhoid and in the minds of the general public the spectre of typhoid persisted.

The provincial rate of mortality of 23.1 per 1000 deaths from typhoid fever in 1900 exceeded the urban rate of 19.2, probably because of inadequate sanitation in many outlying parts of the province. Both provincial and urban rates dropped markedly by 1914 to 10.2 and 8.7 respectively. These data, however, obscure the fact that in some years, such as 1904, 1910, and 1912, the urban rate of mortality from typhoid fever was higher than that for the province. Mortality rates per 10,000 of population fell from 2.9 to 1.3 over the same period throughout the province and from 3.3 to 1.2 in urban areas. (See Tables 3 and 3a). Both the incidence of typhoid and the high levels of mortality from it were sources of shame for the Provincial Board of Health. In 1900, the Board pointed out that 19.3 per cent of those living in urban areas of Ontario who contracted typhoid died from their illness. To emphasize this disgrace, comparisons were made between Ontario's record and the case mortality at the Chickamauga (Tennessee) army camp in 1898 where 20,000 men had contracted typhoid with a case mortality of 10.5. Similarly, in the 1900 epidemic at Bloemfontain, the Board noted that the case mortality again approximated 10.2.[30] The blame for Ontario's high mortality from typhoid was placed unequivocally on the local boards of health whose routine work was "very imperfectly performed," an apparent reference to

the lack of investigation into possible sources of typhoid outbreaks.[31] Citing the example of mortality reduction in London, England, the Provincial Board recommended hospitalization for all cases of contagious disease as the most fruitful way to reduce mortality, noting that provision for the construction of more isolation hospitals already had been made in the Isolation Hospitals' Act of 1894.[32]

Bryce, for one, contended that mere machinery would not solve the problem. What was required was "the enthusiasm of that scientific altruism, which, even apart from its moral aspects, makes personal sacrifice in the interests of the people, as necessary and inevitable, as that of the philosopher Pascal, in the vale of Vaucluse, studying the laws of physics."[33] It was, he contended, "inevitable ... that as with the apostles of an earlier faith, the bones grow dry, and the enthusiasm of the discoverer becomes the routine of his successor who does the same work mechanically." Students of public health, while they should seek out "new and greater victories" must, at the same time, return to "the fountains whence have sprung our streams of knowledge, if they were to continue that enthusiastic love of research and of truth, which has made the past of science, in its application to public health so glorious."[34] Such grand exhortations may have had the desired impact. By 1905, the reporting of typhoid cases had increased fivefold.[35]

Hospitals still failed to report all known cases of typhoid. The Board of Health advocated the strict enforcement of a law requiring superintendents of hospitals who had charge of most of the typhoid cases to notify the Board of the number of cases within their jurisdiction. Increased awareness by the Board of local outbreaks would "lead to the

extinguishment of unsuspected local conditions, which regularly produce typhoid fever, and the irrelevances which now exist between morbidity and mortality statistics of typhoid fever in Ontario would soon disappear."[36] In other words, the Board argued, the more cases of typhoid that were reported, the lower the case mortality would be and a more favourable report could be presented to the public about the chances of surviving an outbreak of typhoid fever. These measures, however, would not save lives. Over time, increased laboratory examination of water samples in both the provincial and municipal laboratories and stricter inspection of milk supplies and dairies appear to have been the most significant factors in the decline of typhoid mortality 1900-1914. Moreover, an amendment, passed in 1910 to the Public Health Act, required the approval of the provincial Board of Health for construction of all municipal water or sewage systems, and in so doing, imposed some minimum, uniform standards of sanitation throughout the region.[37]

In spite of the downward trend in typhoid mortality, epidemics continued to erupt with alarming frequency during the early years of the twentieth century. For example, in 1911, Ottawa reported a total of 987 cases, 83 deaths and a case mortality of 8.4 per cent.[38] Local M.H.O.'s seemed intent on outdoing one another in their explanations of these outbreaks. The M.H.O. for London laid the blame for the spread of typhoid in his city on the house-fly, who "eats and walks over manure, tubercular sputum and worse filth, then comes into the house and deposits this on the food."[39] Typhoid and consumption, he asserted, were undeniably spread in this manner by "this filthiest of all living things."[40] The M.H.O. for Belleville attributed his city's relative freedom from typhoid chiefly

to luck in view of the lack of sewers and the number of cesspools in the city.[41] M.H.O. Pearson of Brantford attributed at least one-third of the cases there in 1910 to new arrivals or travellers who brought the disease with them. Pearson could find no common cause for the outbreak. Consequently, he too, blamed the housefly as "the carrier of infection on account of the non-disinfection of the stool from the primary case."[42] Kingston's epidemic of the same year was traced more realistically to leaks in the intake pipe of the waterworks system and the M.H.O. for Kingston, Dr. A. Williamson, concluded that sewage could no longer be emptied into the lake, the source of the water supply.[43]

Underreporting of cases of typhoid appears to have persisted during this period if the experience of Windsor in 1912 has any widespread application. Typhoid fever "according to public opinion" had been present throughout the city. However, only one case of the disease had been reported to the local health authorities, even though eight death certificates were filed citing typhoid as the cause of death. The outcome of the episode in Windsor was the introduction of chemical treatment of the water supply in order to determine whether water or milk was to blame for the epidemic.[44]

By 1914, typhoid was no longer feared as it had been twenty years earlier. In most urban areas, apparent sources of contamination had been eliminated. Water filtration systems were constructed and daily water samples offered at least a minimum of protection to urban dwellers. Recent U.S. studies, however, indicate a lack of any clear correlation between mortality from typhoid and dysentery and expenditure on water systems. Condron and Crimmins-Gardner conclude that this lack of

correlation now casts some doubt on the validity of the assertion that the "sewers and water works are important in explaining the mortality decline from typhoid fever."[45] Under the circumstances, then, further examination of the relationship between specific public health and sanitation measures is needed before any conclusion can be reached about a definitive cause and effect relationship vis à vis typhoid mortality in Ontario 1900-1914.

Tuberculosis and typhoid fever seem to have provoked a disproportionate share of concern from public health officials in Ontario. Other contagious diseases, such as measles, diphtheria, scarlet fever, and, to a lesser degree, smallpox, contributed far more than typhoid to mortality rates. In Ontario, in 1900, all contagious diseases, excluding tuberculosis, accounted for 77.1 deaths per 1000 deaths and for 79.0 per 1000 in urban areas. In 1910, these mortality rates had fallen only slightly to 70.3 and 70.7 respectively, although by 1914 mortality from these causes had declined to 42.4 per 1000 deaths for the province and 46.3 for urban areas. The rates per 10,000 population show similar decreases. By 1914, the rates of 5.4 for the province and 6.5 for its urban centres were barely half those fifteen years earlier. (See Tables 4 and 4a) Throughout most of the period under study, mortality from contagious disease remained at relatively high levels with urban areas experiencing higher mortality than the province as a whole. Noticeable improvement occurred only after 1911.

Smallpox, one of the most dreaded contagious diseases, had been almost eliminated as a cause of death by 1900. Yet, the terror it had engendered in Ontario throughout the nineteenth century lingered on.

TABLE 4

MORTALITY FROM CONTAGIOUS DISEASE (T.B. EXCLUDED)
PER 1000 DEATHS

YEAR	ONTARIO	URBAN	HAMILTON
1900	77.1	79.0	61.7
1901	87.5	93.9	69.1
1902	69.8	73.6	58.1
1903	74.4	73.3	41.9
1904	55.3	54.9	40.9
1905	46.5	49.1	64.4
1906	58.6	48.3	48.1
1907	58.1	59.8	37.4
1908	62.6	65.9	46.9
1909	67.3	77.5	66.3
1910	70.3	70.7	55.2
1911	67.5	70.7	45.2
1912	56.0	66.3	48.7
1913	49.2	49.6	33.9
1914	42.4	46.3	41.6
AVERAGE	62.8	65.1	50.6

Source: OSP, REG. GEN. REPORTS, 1900-1914.

TABLE 4a

MORTALITY FROM CONTAGIOUS DISEASES (T.B. Excluded)
PER 10,000/POPULATION

YEAR	ONTARIO	URBAN	HAMILTON
1900	9.8	13.4	9.5
1901	11.9	16.0	10.6
1902	8.8	11.6	8.5
1903	10.0	12.8	6.4
1904	7.8	9.7	7.1
1905	6.6	8.6	11.4
1906	8.7	8.4	8.1
1907	8.8	11.6	8.6
1908	9.2	13.2	8.9
1909	9.8	14.8	12.0
1910	10.5	14.7	11.4
1911	9.2	12.7	6.7
1912	7.6	10.0	7.6
1913	6.8	7.9	4.7
1914	5.4	6.5	5.3
AVERAGE	8.7	11.5	8.5

Source: OSP, REG. GEN. REPORTS, 1900-1914.

TABLE 5

ANNUAL MORTALITY RATES FOR DIPHTHERIA AND SMALLPOX
PER 1000 DEATHS

	DIPHTHERIA			SMALLPOX		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	25.0	34.6	25.9	.37	.0	
1901	26.1	38.5	34.6	.24	.37	
1902	24.3	30.7	23.2	.25	.26	
1903	23.2	29.8	22.2	.71	.12	
1904	19.4	23.9	15.1	.10	.23	
1905	16.1	23.2	29.1	.10	.22	
1906	12.9	14.7	24.0	.12	.11	
1907	11.3	12.5	10.4	.12	.0	
1908	13.8	19.7	9.6	.06	.0	
1909	13.2	24.0	18.8	.09	.0	
1910	13.0	19.7	20.7	.06	.0	
1911	12.3	8.3	8.3	.09	.20	
1912	10.7	14.4	5.8	.06	.15	
1913	9.2	12.5	11.6	.05	.07	
1914	12.6	18.0	13.1	.03	.0	
AVERAGE	16.2	21.6	16.7	.16	.11	0

Source: OSP, 1900-1914, REG. GEN. REPORTS.

TABLE 5a

ANNUAL MORTALITY RATES FOR DIPHTHERIA AND SMALLPOX
PER 10,000 POPULATION

	DIPHTHERIA			SMALLPOX		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	3.2	5.9	4.0	.05	.0	
1901	3.5	6.6	5.3	.03	.06	
1902	3.1	4.9	3.4	.03	.04	
1903	3.1	5.2	3.4	.10	.02	
1904	2.8	4.2	2.6	.01	.04	
1905	2.3	4.0	5.2	.01	.04	
1906	1.9	2.8	4.0	.02	.02	
1907	1.7	2.4	1.8	.02	.0	
1908	2.0	3.9	1.8	.01	.0	
1909	1.9	4.6	3.4	.01	.0	
1910	1.9	4.1	4.3	.01	.0	
1911	1.7	1.3	1.2	.01	.04	
1912	1.4	2.3	.9	.01	.02	
1913	1.3	2.0	1.6	.01	.01	
1914	1.6	2.5	1.7	.0036	.0	
AVERAGE	2.2	3.8	3.0	.022	.019	0

Source: OSP, 1900-1914, REG. GEN. REPORTS.

As a result of this deep-rooted fear, outbreaks of smallpox were attended to with great alacrity. Cases of the disease anywhere in the province received widespread publicity in newspapers, and health officials quickly mapped out vaccination programs. The provincial mortality rate per 10,000 of population for smallpox was .37 in 1900. It rose to its highest level, .71, in 1903 and fell to .03 by 1914. The urban rate was even lower. No deaths occurred in cities as a result of smallpox in 6 of the 15 years surveyed and the highest mortality, .37 per 10,000 population, was reached in 1901. (See Tables 5 and 5a). The improvement in mortality reduction from smallpox in the twentieth century, according to McKeown, Record and Turner's study, has been universally attributed by most epidemiologists to vaccination, and this conclusion is, no doubt, valid for the province of Ontario where the restricted confines of the cities made the task of the authorities easier.

There was, however, no effective preventive immunization for other contagious diseases such as measles, whooping cough, scarlet fever, poliomyelitis or diphtheria. Of these illnesses, only diphtheria was amenable to any kind of treatment and, consequently, mortality from these diseases remained fairly constant during most of the period under study. Cities and towns considered themselves fortunate indeed if they escaped yearly onslaughts of these potentially fatal diseases.

A diphtheria antitoxin was available to treat patients once the disease had been accurately diagnosed and this measure had proved to be effective in treating the illness.[46] It was not until 1913 that the Schick skin test was developed to determine immunity to diphtheria. The first large scale immunization programme for school children was

carried out in New York City in 1920.[47] The disease itself was, in 1900, of relatively recent origin in North America, having come from the continent in the mid-nineteenth century. It had only been designated a separate disease from scarlet fever in 1855 when a pandemic of diphtheria swept Europe.[48] A second major outbreak occurred in 1890, whereafter the incidence of the disease decreased steadily over the next thirty years.[49] The decline in mortality from diphtheria has been attributed to the effectiveness of antitoxins and later to immunization programmes. McKeown, Record and Turner, on the other hand, point out that because mortality from similar diseases such as scarlet fever fell in this same time period, apparently without effective treatment, the same might be true for diphtheria.[50] According to George Rosen, the decline in both diphtheria mortality and morbidity began even before diphtheria antitoxin came into common use and it continued at the same steady rate until immunization programmes were implemented. He argues that the decline "is related to the fact that certain communicable diseases, among them diphtheria, occur in waves with intervening periods during which the disease is either absent or at least significantly rare."[51] However, Rosen credits immunization programmes with accelerating the downward trend in diphtheria mortality. Whatever the reasons, mortality from diphtheria did decline in Ontario, as elsewhere, in the years under study, but the decrease was not without some fluctuations indicating severe epidemics of the disease. Diphtheria mortality rates, like those for tuberculosis, were significantly higher in urban areas of Ontario. For example, in 1900, mortality from diphtheria in the urban areas was 34.6 per 1000 deaths while the provincial rate was 25 per 1000. Only once, in 1911, was the urban rate lower than

the provincial rate (8.3 compared to 12.3) and in 1914, the urban rate of 18.0 per 1000 deaths was 50 per cent higher than the provincial rate of 12.6. The death rates per 10,000 population show the same dichotomy with urban rates in several years double the province wide rates. (See Table 5a). In 1900, diphtheria deaths in Toronto alone accounted for one-third of the total diphtheria deaths in the province, while the population of the city constituted one-tenth of the province's population.[52]

The Ontario Board of Health had established a public health laboratory in Toronto in 1890, the first in North America.[53] It was able to test sputum for diphtheria bacillus and to provide antitoxin to combat the disease.[54] Neil Sutherland in his book, Children in English-Speaking Society, credits the lab and the use of antitoxin with a "notable decline in diphtheria deaths" even before 1900.[55] As noted previously, the validity of this interpretation is open to question in terms of general historical patterns of disease and mortality. It seems to be even more questionable in relation to Ontario because of the limitations of the laboratory itself. Dr. J.A. Amyot recalled that when he took over the lab in 1900, he "was alone. [He] cleaned the glassware, fed the animals, made up the media and standard solutions, did the examinations, the results of which (1,250 that year) [he] reported in longhand."[57]

Some public health officials laid the blame for high mortality rates from diphtheria on the public, particularly on the parents of infected children. Ottawa's M.H.O., W.T. Shirreff, reported that many of the cases of diphtheria in his city in 1912 could have been prevented had "the parents or those responsible ... fully appreciated the importance of reporting the cases early, either to their family physician or to the

Medical Health Office or Officer." He warned that "a sore throat in a child is a dangerous malady, and should always be seen by a physician at once."[57] The cost of diphtheria was measured in both lives and dollars and cents in Ottawa. In 1912, diphtheria patients there had spent 4,478 days in hospital for a total expenditure of $8,149.96. M.H.O. Yeomans of Belleville worried about a 1910 outbreak of diphtheria that "held on for some months, one or two cases at a time being under observation." He attributed the relative "mildness" of the outbreak to the "furnishing of free antitoxins in all cases where the attending physician certifies that the family are unable to pay for it."[58] This measure had been recommended by the Ontario Board of Health in 1907,[59] but was not instigated by the Board until 1916.[60] In the meantime, access to the antitoxin may have been denied to many who would have benefitted especially in the difficult years from 1908 to 1911.

In spite of the wider use of antitoxin, the regular inspection of school children by trained nurses in some urban centres after 1907, and in spite of stricter adherence to quarantine enforcement, the ratio of deaths from diphtheria to total mortality from contagious disease remained constant at a ratio of 1 in 3 throughout the province. Urban areas experienced only a slightly greater decrease during these years. In 1900, diphtheria had accounted for 45 per cent of all deaths from contagious disease while in 1914, the proportion had been reduced to 38 per cent. When viewed in these terms, the change in diphtheria mortality is not startling and these statistics suggest again that McKeown, Record and Turner's interpretation of the decline of mortality from diphtheria probably is applicable to Ontario as well.

TABLE 6

ANNUAL MORTALITY RATES FOR WHOOPING COUGH & OTHER CONTAGIOUS DISEASES* PER 1000 DEATHS

	WHOOPING COUGH			OTHER CONTAGIOUS DISEASES		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	6.3	4.5	1.2	22.3	20.8	14.8
1901	5.6	5.4	7.4	38.7	35.3	14.8
1902	7.3	6.9	14.2	23.9	23.9	7.4
1903	6.9	8.3	3.7	30.4	23.3	11.1
1904	3.4	2.6	.0	16.9	11.4	16.2
1905	5.8	4.7	10.4	10.3	8.0	11.4
1906	7.3	6.0	.0	11.1	7.2	3.3
1907	6.4	7.3	1.0	24.8	23.2	18.7
1908	7.6	8.2	8.6	21.1	19.1	16.3
1909	8.0	6.5	9.9	25.5	29.0	26.7
1910	5.5	5.6	.0	30.7	20.6	25.0
1911	4.9	13.8	6.6	31.7	20.6	15.7
1912	12.1	12.9	15.3	19.3	18.6	22.5
1913	7.4	5.5	4.3	20.6	20.1	8.7
1914	5.6	5.8	13.9	14.1	13.8	9.2
AVERAGE	6.7	6.9	6.4	22.7	19.0	12.6

*These include: Measles, Scarlet Fever, Polio, Mumps, Chicken Pox, etc.

Source: OSP, REG. GEN. REPORTS 1900-1914.

TABLE 6a

ANNUAL MORTALITY RATES FOR WHOOPING COUGH & OTHER CONTAGIOUS DISEASES PER 10,000 POPULATION

	WHOOPING COUGH			OTHER CONTAGIOUS DISEASES		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	.8	.8	.2	2.8	3.5	2.3
1901	.8	.9	1.1	5.2	6.0	2.3
1902	.9	1.1	2.1	3.0	3.8	1.1
1903	.9	1.4	.6	4.1	4.1	1.7
1904	.5	.5	.0	2.4	2.0	2.8
1905	.8	.8	1.8	1.5	1.4	2.0
1906	1.1	1.1	.0	1.6	1.3	.5
1907	1.0	1.4	.2	3.7	4.5	3.3
1908	1.1	1.6	1.6	3.1	3.8	3.1
1909	1.2	1.2	1.8	3.7	5.5	4.8
1910	.8	1.2	.0	4.6	4.3	5.2
1911	.7	2.2	1.0	4.3	5.5	2.3
1912	1.6	2.0	2.4	2.6	2.9	3.5
1913	1.0	.9	.6	2.8	3.3	1.2
1914	.7	.8	1.8	1.8	1.9	1.2
AVERAGE	.9	1.2	1.0	3.2	3.6	2.5

Source: OSP, REG. GEN. REPORTS, 1900-1914

As the statistics for the years 1900-1914 indicate, the incidence of whooping cough and mortality rates associated with it were one of the least predictable elements in the spectrum of public health concerns. (See Tables 6 and 6a). No substantial improvement in mortality from whooping cough took place either throughout the province or in urban areas. The mortality rates of 6.3 per 1000 deaths for the province and 4.5 per 1000 for urban centres for 1900 were lower only in 1904 at 3.4 and 2.6 respectively and peaked in 1912 with rates of 12.1 and 12.9. Physicians and public health officials were virtually defenseless in the face of epidemics of whooping cough until the introduction of sulfamonides in 1938 and effective innoculation in 1952.[61] Only in a few isolated years, such as 1904, when Ontario seems to have escaped an epidemic of whooping cough can any decrease in total mortality from contagious disease be attributed to a similar decrease in mortality from whooping cough. Ontario's experience with mortality from whooping cough appears to have been somewhat different from the British experience during the same period. In Britain, the mortality from whooping cough fell by one-third during the years 1902 to 1907[62] and continued its downward path in spite of the lack of therapeutic measures to fight the disease. The mortality rates per 10,000 in Britain during this period were, however, slightly higher than those in Ontario at 3.1 per 10,000 population in 1901 and 2.4 in 1911.[63] Comparable rates for Ontario were .8 and .7.

Provincial health officials paid little attention to mortality from whooping cough, perhaps because they realized that they had only limited control over the spread of the disease. When an epidemic broke out, the mortality rate appears to have been very high for those who

contracted the disease. For example, a case mortality rate of 33 per cent was recorded in the province for the 279 cases reported in 1904, a year relatively free of the disease. Similarly, in 1905, 106, or 14 per cent of the 751 victims of whooping cough died.[64] This high mortality was common wherever whooping cough struck in Ontario. Ottawa reported a case mortality rate of 38 per cent for the outbreak in 1911.[65] James Roberts, M.H.O. for Hamilton, charged that the "baneful results" of whooping cough often went unnoticed by the authorities because, in the returns to the Registrar General, deaths from whooping cough and measles were frequently attributable to broncho-pneumonia.[66] On the other hand, the M.H.O. for London credited improved record keeping with reducing the mortality from whooping cough in his city. Only one death was reported from 73 cases in 1913. During what was termed a mild outbreak in London, physicians had been sent printed, stamped postcards for convenient reporting of cases to the M.H.O. who then used his authority to enforce quarantine. However, in the following year, the report from London to the Ontario Board of Health overlooked the four deaths from whooping cough which were reported to the Registrar-General in the death reports.[67]

In many municipalities, whooping cough was not classified as a separate treatable disease but was aggregated, for statistical purposes at least, with measles, scarlet fever and other generally less serious zymotic diseases such as mumps, chicken pox and erysipelas. After 1910, when the first major outbreak was identified, poliomyelitis was included in this wide category. These illnesses, either alone or collectively, received little recognition as potentially fatal ailments, despite the fact that as a group, in all but two years of this study, they accounted

for a mortality rate at least the equal of typhoid or diphtheria. For example, in 1900, this category of disease accounted for 22.3 deaths per thousand deaths throughout the province. In 1901, the peak year for mortality from this cause, the rate of 38.7 per 1000 deaths was nearly the equal of the mortality from diphtheria and typhoid together in Ontario. (See Tables 6 and 6a). Moreover, as has been noted with whooping cough, the rate fluctuated considerably. Consequently, the rates for 1910 are higher than those recorded ten years earlier both throughout the province and at the municipal level. Yet, deaths from these diseases were seldom the topic of any discussion by either the Ontario Board of Health or the municipal M.H.O.'s., no doubt, at least partly because no effective means were available either to prevent or to treat these diseases.

Tacit recognition of the potential dangers to public health from this group of illnesses was given in 1912 when the Provincial Board of Health added mumps, measles, poliomyelitis, along with tuberculosis, to the list of notifiable diseases. Many M.H.O.'s continued to view these illnesses as time consuming and expensive nuisances. Under the circumstances, notification was not universally effective. M.H.O. Williamson of Kingston complained that in his city many cases of measles were still going unreported and that many cases would never see a doctor until the illness was over and the patient needed a certificate for re-admission to school.[68] M.H.O. Roberts of Hamilton was equally critical of the new provincial regulations. As shall be seen in Chapter IV, Roberts frequently protested about the heavy workload placed on his under-staffed department. The legislation enacted in 1912 required placards for measles and Roberts' staff was severely overtaxed during an epidemic

in 1914 when 1083 cases of measles and 613 of whooping cough were under observation.[69] J.C. Robertson, Stratford's M.H.O., condemned public attitudes toward these illnesses. He blamed parents, in particular, for the failure to control measles and its companion, whooping cough. He maintained that in Stratford, "when it becomes known ... that either of these diseases is prevalent in the city, [parents] abstain from sending for medical aid, and consequently no report is made and the children are allowed to mingle with others long before the requirements of quarantine expire, thereby spreading the disease."[70]

Again, it is difficult to evaluate the role that any of the preventative steps taken by the provincial Board of Health to control these contagious diseases may have had on the mortality rates. Certainly, deaths from these diseases show an abrupt drop in the years immediately following the laws requiring notification in 1912. Nevertheless, further analysis is required to determine whether the regulations were actually enforced in the face of apparently widespread resistance. Equally convincing explanations for the decline in mortality are offered by McKeown, Record and Turner who argue that, for measles in particular, mortality rates were higher among the poor. They attribute the rapidly falling rates of mortality from measles after 1915 to improved nutrition and to better living conditions. An analysis of mortality from these causes in Hamilton in 1910 tends to substantiate their contention that "mortality rates were much greater among the poor than among the well-to-do."[71]

In the early years of the century, health officers, at both provincial and local levels, concentrated their attempts to improve

mortality rates on the communicable disease outlines above. Before 1905, neither health officers nor the public seem to have understood that infant mortality was the largest single component of the mortality rates in the region and in its urban areas. One of the first in the province to acknowledge publicly the need to improve infant care was Charles Hodgetts, at the time Deputy Registrar General and Chief Health Officer of Ontario, who, at a board meeting in 1906, pointed out the board's obligation to draw the attention of the public to this matter. A part of Hodgetts' concern in this regard appears to have been a product of his nationalism. He opposed immigration, arguing that improving the survival rates for children of native-born parents was a preferable method of increasing the population to spending "thousands to bring out a very questionable young stock from the crowded centers of Great Britain."[72] Hodgetts directed his associates and the public to the need to educate young Canadian married couples in the duties and importance of rearing children of their own. The baby, he argued, was invaluable to the state and failure to recognize this would "lead to national ruin similar to that which befell the nations of Greece and Rome."[73] Historians might quibble with Hodgetts' interpretation. Yet his statements are indicative of a growing concern by the Ontario Board of Health about the importance of the child to both the family and the state, concern which reflected the advent of a nation-wide movement toward child and family-centred social reform.[74] Hodgetts appears to have aligned himself with the eugenists who favoured selective breeding as the solution to the problems of race degeneration. Five years later, however, the emphasis had shifted. By 1910, the movement to reduce infant mortality stressed environmental change as the answer to social problems.

At the same time, Hodgetts seized upon an increase in reported stillbirths in Ontario as evidence of an even more serious social problem -- that of abortion and infanticide. "This silent slaughter of the innocents," Hodgetts concluded, was

> freely and indifferently indulged in by all classes of the community an evil hydreaheaded [sic] in character which is greater than the drink question and more far reaching in the effects than all other social evils put together, one claiming the attention of the pulpit, the press, the medical profession and the innumerable societies of men and women having for their object the bettering of mankind, who must without any false modesty meet the evil and deal with it without gloves.[75]

The increase in stillbirths over the past few years could not, in his opinion, have resulted from natural causes alone. Although they cannot confirm Hodgetts' diagnosis of the cause of the upswing in stillbirths, statistics indicate that he was accurate in noting the increase. In Ontario, stillbirths accounted for 32.2 per 1000 deaths in 1900, 54.0 in 1904 (the statistics which provoked Hodgetts to speak out) and by 1914, 78.0. In urban areas, the rate rose from 48.8 per 1000 in 1900 to 62.5 in 1904, 84.7 in 1911 and 97.6 in 1914. (See Tables 7 and 7a). The rate per 10,000 population more than doubled during this period, from 4.1 per 10,000 in 1900 to 10.0 in 1914 throughout the province and from 8.3 to 13.8 in urban centres. Hodgetts quite clearly had identified a persistent, but seldom recognized, component of the province's mortality rate.

An analysis of all infant mortality statistics in the years 1900-1914 indicates that the concern of Hodgetts and other like him was not misdirected. In a recent book, Carl Degler denies "that by the opening of the nineteenth century parents [had] an increased sense of security about the survival of their children."[76] In Ontario, and in its urban

TABLE 7

ANNUAL MORTALITY RATES FOR CHOLERA INFANTUM AND STILLBIRTHS PER 1000 DEATHS

	CHOLERA INFANTUM			STILLBIRTHS		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	57.2	70.6	58.0	32.2	48.8	59.3
1901	33.3	44.2	22.2	37.4	53.0	56.8
1902	28.5	36.3	25.8	41.3	55.3	60.6
1903	36.8	52.4	77.6	42.6	48.7	50.5
1904	28.9	45.0	23.7	54.0	62.5	81.9
1905	47.4	55.5	45.7	51.7	73.6	88.3
1906	51.0	59.2	42.6	46.9	64.9	81.9
1907	31.5	46.0	30.1	52.1	63.8	89.3
1908	42.0	56.3	82.3	54.0	63.7	68.9
1909	40.1	61.2	63.3	56.3	64.5	87.0
1910	41.0	63.4	63.8	65.8	77.1	100.0
1911	39.8	57.8	46.4	71.7	84.7	108.4
1912	33.0	51.2	48.7	74.5	90.9	111.2
1913	53.9	75.5	61.3	72.4	93.6	126.3
1914	34.5	44.7	40.0	78.0	97.6	110.9
AVERAGE	39.9	54.6	48.8	55.4	69.5	85.4

Source: OSP, REG. GEN. REPORTS, 1900-1914.

TABLE 7a

ANNUAL MORTALITY RATES FOR CHOLERA INFANTUM & STILLBIRTHS
PER 10,000 POPULATION

	CHOLERA INFANTUM			STILLBIRTHS		
YEAR	ONTARIO	URBAN	HAMILTON	ONTARIO	URBAN	HAMILTON
1900	7.3	12.0	8.9	4.1	8.3	9.1
1901	4.5	7.5	3.4	5.1	9.0	8.7
1902	3.6	5.7	3.8	5.2	8.7	8.8
1903	5.0	9.1	11.9	5.8	8.5	7.7
1904	4.1	7.9	4.1	7.7	11.0	14.1
1905	6.7	9.7	8.1	7.3	12.8	15.7
1906	7.6	10.3	7.1	6.9	11.3	13.7
1907	4.8	8.9	5.3	7.9	12.3	15.6
1908	6.2	11.3	15.5	7.9	12.7	13.0
1909	5.9	11.7	11.4	8.2	12.3	15.8
1910	6.1	13.2	13.1	9.9	16.0	20.7
1911	5.4	9.4	6.8	9.8	13.8	16.0
1912	4.4	8.1	7.6	10.0	14.3	17.2
1913	7.4	12.1	8.4	10.0	15.0	17.4
1914	4.4	6.3	5.1	10.0	13.8	14.2
AVERAGE	5.6	9.5	8.1	7.7	12.0	13.9

Source: OSP, REG. GEN. REPORTS, 1900-1914.

centres in particular, it appears that at the beginning of the twentieth century, the situation had not changed. In fact, for some categories of infant disease such as cholera infantum, the mortality rates may have increased from 1890 to 1900.[77] The mortality from cholera infantum in urban areas in 1890 had been 6.1 per 10,000 population while ten years later it was double that at 12.0. The increase may, however, be partially the result of better reporting methods.

Infant mortality rates can be calculated in a variety of ways. Not until the movement to save infant lives was well underway in 1909 and 1910 were figures calculating the number of infant deaths as percentage of the total births for the year, the accepted international procedure, published in the Board of Health reports. It appears that as the reported rates rose, stillbirths were excluded from these computations. In 1900, the number of infants who did not reach their first birthday was 137.2 per 1000 births, stillbirths excluded. The rate for urban areas was much higher, 205.5 per 1000 births. After 1900, the rates declined, but in an uneven fashion with urban areas showing the most improvement. (See Table 8). In 1910 the rates were 123.9 for the province and 168.7 for cities, excluding stillbirths. By 1914 the rates had dropped to 103.2 and 116.0 respectively. But if stillbirths are included, the urban infant mortality remained above 200 per 1000 births until 1911.

It was not until 1908, however, that the Provincial Board of Health admitted publicly that the infant mortality rate of 125 per 1000 births in Ontario discredited their work. They launched an investigation of the problem. By 1910, what Hodgetts had envisaged as a campaign to save infant lives had been transformed on paper at least into a "great

TABLE 8

INFANT MORTALITY RATES, 1900-1914

YEAR	ONTARIO		URBAN RATES	
	STILLBIRTHS EXCLUDED	STILLBIRTHS INCLUDED	STILLBIRTHS EXCLUDED	STILLBIRTHS INCLUDED
1900	137.2	155.0	205.5	237.3
1901	120.9	142.5	177.5	212.6
1902	104.0	125.6	152.5	185.9
1903	114.7	137.7	174.8	205.2
1904	107.3	137.3	156.4	196.3
1905	120.7	148.2	161.9	204.5
1906	136.9	162.5	163.3	201.0
1907	121.4	150.1	151.2	188.7
1908	124.5	151.6	164.8	198.0
1909	131.7	161.9	175.0	209.9
1910	123.9	158.5	168.7	210.1
1911	117.2	155.2	150.2	195.7
1912	110.3	147.8	139.3	183.9
1913	117.7	152.9	140.3	183.7
1914	103.2	138.9	116.0	157.6
AVERAGE	119.4	148.4	159.8	198.0

Source: OSP, REGISTRAR GENERAL REPORTS, 1900-1914.

and holy cause" rooted firmly in Christian ethics,[78] as Ontario added its belated support to the world wide movement to reduce infant mortality. French and British public health officers whose ministrations to provide clean milk for babies seemed to have effectively reduced infant mortality in those countries provided examples for reformers in Ontario. In England, ostensibly because of the various organized campaigns directed against infant mortality, infant mortality rates fell from 156 per 1000 births for the five year period 1896-1900 to 117 for the period 1906-1910.[79]

Three reports on infant mortality were drafted for the provincial Board of Health by Dr. Helen MacMurchy, a Toronto born graduate of Johns Hopkins University, during the years 1909 to 1913.[80] These reports are based heavily on British rather than American attempts to improve infant mortality. They recommend payments to mothers for birth registration, a procedure carried out with some success in Huddersfield, England, adequate training for midwives, more extensive inquiry into the circumstances surrounding stillbirths and instruction for mothers in proper infant feeding and hygiene.[81] Most important, Dr. MacMurchy rejected the Darwinian theories of other spokesmen, such as Charles Hodgetts, who attempted to justify the high rates of infant mortality by dismissing, in particular, deaths from congenital disease and premature births as "inevitable." Hodgetts postulated that "as weaklings, it is perhaps as well for the race that they are removed in infancy." In short, MacMurchy took the euthenic and Hodgetts the eugenist side of the debate over the causes of infant mortality. Hodgetts nevertheless recognized that preventative measures, for example, proper prenatal care, might ensure the birth of a healthy child "to be reared for the state."[83]

Dr. MacMurchy's reports pointed out that infant mortality was highest "under conditions of life where filthy privies are permitted, where scavenging is neglected, and where the street and yards are to a large extent not 'made up' or paved."[84] Certainly, as will be seen in the next chapter, there were differences from ward to ward in Hamilton in the rates of infant mortality. On the other hand, cholera infantum at least, showed no tendency to be more common in those areas of Hamilton where adequate sanitation might have been lacking. The responsibility for better civic sanitation was assigned by MacMurchy to local public health authorities, "the appointed guardians of masses of human beings whose lives are at stake in the business."[85]

In the final analysis, the MacMurchy reports laid the ultimate blame for infant mortality on the mothers, particularly on those mothers who abandoned their infants in favour of the workplace. Dr. MacMurchy's report of 1909 accepted without question the popular adage "where the mother works the baby dies," and, as evidence, cited a recent British study which had determined that 32 per cent of children of the working class, 21 per cent of the middle class, but only 10 per cent of the aristocratic class died in their first year of life.[86] A recent study by Carol Dyhouse suggests that the economic status of the family, whether the mother worked or not, was the determinant in infant mortality. She has shown that the children of working mothers had a better chance of survival than those in the same social stratum whose mothers did not work to bring in the extra income needed to raise the family's living standards.[87] Not poverty but ignorance on the part of mothers was, argued Dr. MacMurchy, the chief cause of infant mortality in Ontario. Parental education was

essential to remedy the situation. She also recommended that births should be registered so that public health nurses could visit all newborns, that mothers be encouraged to nurse their babies, and that social conditions in general be improved if any progress was to be anticipated in infant mortality. These were, however, long term solutions for a problem that public health officials admitted needed immediate attention.[88]

The Ontario Board of Health was not alone in voicing its distress over infant mortality. An editorial in the Public Health Journal in May, 1911, blamed failure to report all births for the high mortality rates, suggesting that Ontario's registration of births did not reach the ninety per cent mark that "other civilized countries" had attained.[89] This accusation is hard to disprove, but, even if it were true, infant mortality levels would still have been high. Public health officials were not satisfied by the explanation. Two subsequent articles published in the same journal provide what is probably a more accurate assessment of infant mortality at the time. One article was written by Robert Wodehouse who, as M.H.O. for Fort William, faced one of the highest infant mortality rates in the province when, in 1910, the rate reached 248.8 per 1000 births, stillbirths included.[90] Alarmed by these statistics, Wodehouse undertook his own survey of infant mortality, visiting every home where an infant death had occurred. He collected detailed information for cases where infants had died from diarrhoeal disease. From interviews with the mothers of the deceased infants, he concluded that "not one breast-fed baby had died from intestinal problems."[91] Moreover, contradicting the arguments from sanitatians, he found that two-thirds of the infant deaths had occurred in the sewered parts of Ft. William where hygiene and

cleanliness were supposedly at their best. Nor did Wodehouse find any direct connection between the country of origin of the parents and infant mortality as popular arguments were wont to suggest.

A.D. Blackader of McGill, writing a year later in the same journal, stressed the necessity for an infant to have its mother's milk rather than tinned preparations or even cow's milk. The state, argued Blackader, must recognize "that every mother who brings a child into the world has done the state a service, and that it is a duty to see that the young life is given a fair chance at the outset."[92] Blackader, who was familiar with the problems of working mothers in Montreal, acknowledged that social and economic inequalities were a vital factor in the nursing of infants - that "nourishing food, sufficient sleep, freedom from excessive worry and a certain amount of outdoor exercise" were not within the reach of the working mother who was condemned to raise her children in crowded houses or apartments. Blackader, rather patronizingly, applauded the efforts of poor mothers to raise their babies, noting that it was "often wonderful how they can feed at all." His solution to the problem of infant mortality, based on his own experience, was state-provided pure milk for those in economic distress, but not without the prerequisite of compulsory education in infant care.[93]

M.H.O.'s and interested citizens throughout Ontario took these messages to heart and in larger centres, such as Toronto and Hamilton, pure milk depots were established, after 1908, to offset the summer ravages of cholera infantum. Infant health clinics and home visitation programmes by public health nurses often augmented the clean milk campaigns. Yet, the results of these programmes were not immediately measurable.

TABLE 9

ONTARIO: MORTALITY RATES PER 10,000 POPULATION FROM ALL CAUSES

CAUSE	1900	1905	1910	1914	1900-1914 INCREASE	1900-1914 DECREASE
TYPHOID	2.93	2.02	3.15	1.30		1.63
SMALLPOX	.05	.02	.01	.01		.04
DIPHTHERIA	3.17	2.28	1.94	1.61		1.56
WHOOPING COUGH	.80	.82	.83	.71		.09
OTHER CONTAGIOUS	2.82	1.47	4.59	1.80		1.02
TUBERCULOSIS	14.98	12.08	10.22	8.50		6.48
CANCER	4.54	5.54	7.40	7.15	2.61	
DIABETES	.83	1.00	.99	1.03	.20	
GENERAL DISEASE	3.47	3.17	4.54	4.36	.89	
NERVOUS	14.36	16.76	12.27	12.74		1.62
RESPIRATORY	12.88	14.56	13.73	12.59		.29
CIRCULATORY	8.62	9.42	14.03	15.33	6.71	
DIGESTIVE	7.59	7.65	7.93	6.50		1.09
CHOLERA INFANTUM	7.26	6.73	6.13	4.42		2.84
GENITO-URINARY	3.56	5.18	5.57	5.47	1.91	
PUERPERAL	1.07	.96	1.30	1.23	.16	
LOCOMOTIVE	.10	.07	.15	.12	.02	
MALFORMATIONS	9.91	16.04	1.09	.64	3.32	
OTHER INFANT DISEASES	.17	.49	10.96	12.76		
STILLBIRTHS	4.09	7.35	9.85	9.99	5.90	
SKIN	.33	.50	.51	.88	.55	
SUICIDE	.32	.49	.41	.55	.23	
ACCIDENTS	4.48	6.06	6.85	6.30	1.82	
SENILE DECAY	13.81	16.82	14.35	10.14		3.67
UNDEFINED	3.68	5.43	8.43	1.77		1.91
TOTAL	125.82	142.91	147.23	127.90	24.32	22.24

Source: OSP, REGISTRAR GENERAL REPORTS, 1900-1914.

TABLE 10

URBAN ONTARIO: MORTALITY FROM ALL CAUSES / 10,000 POPULATION

CAUSE	1900	1905	1910	1914	1900-1914 INCREASE	1900-1914 DECREASE
TYPHOID FEVER	3.26	2.27	5.15	1.24		2.02
SMALLPOX	.0	.09	.0	.0		
DIPHTHERIA	5.87	4.03	4.10	2.54		3.33
WHOOPING COUGH	.76	.81	1.17	.82	.06	
OTHER CONTAGIOUS	3.54	1.40	4.27	1.95		1.59
TUBERCULOSIS	22.75	14.12	12.99	8.71		14.04
CANCER	6.92	7.60	9.95	8.56	1.64	
DIABETES	.99	1.38	1.37	.89		.10
GENERAL DISEASES	4.02	4.34	6.78	4.31	.29	
NERVOUS	22.05	18.81	18.31	12.98		9.07
RESPIRATORY	18.50	18.11	22.23	14.78		3.72
CIRCULATORY	12.02	13.63	20.08	16.62	4.60	
DIGESTIVE	8.23	8.72	13.90	7.73		.50
CHOLERA INFANTUM	11.99	9.66	13.20	6.31		5.68
GENITO-URINARY	5.70	7.64	8.70	6.18	.48	
PUERPERAL	.88	.74	2.06	1.47	.59	
LOCOMOTIVE	.19	.27	.36	.21	.02	
MALFORMATIONS	12.65	12.71	1.97	.73	3.98	
OTHER INFANT DISEASES	.11	.31	17.16	16.02		
STILLBIRTHS	8.29	12.82	16.05	13.80	5.51	
SKIN	.46	.52	1.06	.97	.51	
SUICIDE	.40	.60	.52	.75	.35	
ACCIDENTS	5.58	6.63	9.29	5.94	.36	
SENILE DECAY	11.49	12.08	11.91	6.42		5.07
UNDEFINED	4.97	6.01	6.33	1.49		3.48
TOTAL	171.62	165.30	208.91	141.41	18.39	48.60

Source: OSP, REGISTRAR GENERAL REPORTS, 1900-1914.

In fact, the mortality rate per 1000 deaths from cholera infantum in urban areas reached its highest levels during the period under study, 75.5, in 1913, when the clean milk campaigns were at their height. Infant mortality for the province as a whole was higher in 1913 than it had been ten years earlier, before dropping sharply both throughout the province and in urban areas in 1914. The failure to reduce infant mortality was attributed chiefly to the persistence of cholera infantum as a result of careless feeding habits, but stillbirths and infant deaths from all causes per 1000 deaths and per 10,000 population followed similar patterns throughout the period. (See Table 9 and 10). The Provincial Board of Health was forced to admit in 1914 that their efforts in the form of public health exhibits, popular lectures and the distribution of literature, measures which show the influence of the American "New Public Health" movement with its stress on education, had not "met with the success one would like to see."[94] Because "it is generally conceded that educational methods are the best means at our disposal for the improvement of infant mortality," the Board decided that "the struggle [would be] kept up and present efforts increased with a hope for better things."[95] A year later, a dramatic change seems to have taken place. Infant mortality rates for 1914 were the lowest since 1900 with urban areas experiencing a drop of 17 per cent from 1913. The provincial rate of 103.2 and the urban rate of 115.9 gave public health officials, always sensitive to the slightest variation in rates, some reason to be optimistic about future progress. This improvement was seized upon by anxious public health officials as proof that the pure milk campaigns were at least having the desired effect.[96] In so far as the cholera infantum mortality rates were lower than they had been since 1902

and 1904, they were correct. Deaths attributable to cholera infantum accounted for only part of the overall decrease throughout the period under study. As in Britain, the decline coincided with the rise of the infant welfare movements. Carol Dyhouse urges caution in interpreting this as "a simple relation of cause and effect."[97] Events in Ontario should perhaps be treated just as circumspectly. The outbreak of war in 1914, and the consequent loss of life, gave new impetus to infant conservation as a part of a wider campaign to save "a national resource."[98] Just what standards might reasonably be anticipated posed a bothersome problem for officials and infant mortality continued to be a matter of public and official concern for the next two decades.

Mortality from contagious diseases (including tuberculosis), from infant diseases, and from stillbirths accounted for only one in three of the deaths recorded in Ontario 1900 to 1914, yet they became the persistent preoccupation of public health workers attempting to improve mortality rates and the health of the population of Ontario. Two-thirds of all deaths occurred from causes over which these professionals obviously felt they had little control or which were beyond the sphere of a public health movement that took for its particular domain the social and environmental factors underlying the record of disease and death in their respective communities. Among the recalcitrant diseases only cancer was ever singled out for some comment because of a suspicion that it might be contagious. Even maternal deaths which were intrinsically linked to infant mortality did not come under scrutiny until after World War I when "the immense loss of life" directed "attention to the paramount need of a campaign in the interest of the conservation of life."[99]

This chapter has focused on mortality from contagious diseases and infant mortality in the province of Ontario, 1900-1914, generally, and in urban Ontario, especially, for two reasons. First, contemporary opinion, official and public, seemed to accept the idea that some of these sources of mortality were amenable to specific remedial measures and that subsequent reductions in the death rate from these causes would be, in turn, a mark of their effectiveness in sustaining and improving the social, economic and physical well-being of Edwardian Canadians. Second, as reference points for a specific study of public health in Hamilton, 1900-1914, the subject matter of the next two chapters, these data and the contemporary response which they generated are essential background information. They provide the basis of an understanding of the "health" of Hamilton's population 1900-1914 in relation to the province of Ontario and to its urban areas; and they provide a context in which to assess the activities of Hamilton's public health officials, politicians, social activists and public commentators who were involved in the struggle to improve, or sometimes merely defend, Hamilton's image as a healthy place in which to live.

That is not to say that other causes of mortality should be ignored. Indeed, as we shall see, certain other sources of mortality in Hamilton, respiratory illnesses and cancer, for example, must be considered as vital problems of Hamilton's human ecology. In the end, public health in Hamilton was a microcosm of public health in the region both because of and in spite of the active intervention of dedicated public officials in the morass of disease and mortality and its social and economic implications.

FOOTNOTES

[1] B. Benjamin, Health and Vital Statistics, (London, George Allen and Unwin, 1968), p. 82.

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[4] OSP, 1905, No. 9, p. 12.

[5] W.B. Bailey, Modern Social Conditions (New York, 1906), p. 243.

[6] A.D. Blackader, "The More Important Causes Underlying the Heavy Infantile Death Rate in Large Cities and the Benefits to be Derived from the Establishment of Milk Depots," The Public Health Journal, III (July, 1912), 368.

[7] OSP, 1902, No. 33, p. 30.

[8] Ibid.

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[10] George Rosen, "Disease, Debility and Death," In H.J. Dyos and M. Wolff (eds.), The Victorian City: Images and Realities, Vol. 2 (London, 1973), p. 641; Edward O. Otis, The Great White Plague, Tuberculosis (New York, 1909), pp. 58-80.

[11] Richard H. Shyrock, Medicine in America: Historical Essays, (Baltimore, 1966), p. 24; Otis, The Great White Plague, p. 49.

[12] F.B. Smith, The People's Health, 1830-1910 (London, 1979), p. 288.

[13] J.T. Phair, "Public Health in Ontario," in R.D. Defries, ed., The Development of Public Health in Canada (Toronto, 1940), p. 83.

[14] Gretchen A. Condran and Eileen Crimmins-Gardner, "Public Health Measures and Mortality in U.S. Cities in the Late Nineteenth Century," Human Ecology, 6 (1978), 45.

[15] Thomas McKeown, R.G. Record and R.D. Turner, "An Interpretation of the Decline of Mortality in England and Wales during the Twentieth Century," Population Studies, 29 (3), 411-412.

[16] OSP, 1905, No. 36, p. 6.

[17] OSP, 1904, No. 36, p. 45.

[18] Ibid., p. 47.

[19] OSP, 1904, No. 36, p. 103.

[20] OSP, 1901, No. 33, p. 16.

[21] Ibid.

[22] Ibid., p. 18.

[23] OSP, 1913, No. 19, p. 11.

[24] P.H. Bryce, "Immigration and its Effects upon the Public Health", Public Health Journal, IV (December, 1913), 646.

[25] OSP, 1913, No. 20, p. 9.

[26] Phair, "Public Health in Ontario," 84.

[27] OSP, 1908, No. 36, p. 97.

[28] McKeown, Record and Turner, "Interpretation of the Decline in Mortality," 418.

[29] Edward Meeker, "The Improving Health of the United States, 1850-1915," Explorations in Economic History, 9 (Summer, 1972), 366; McKeown, Record and Turner, "Interpretation of the Decline in Mortality," 418.

[30] OSP, 1903, No. 36, p. 20.

[31] Ibid.

[32] Ibid., pp. 22-23.

[33] Ibid., p. 26.

[34] Ibid., p. 27.

[35] OSP, 1906, No. 36, p. 6.

[36] Ibid., pp. 44-45.

[37] OSP, 1911, No. 20, p. 8.

[38] OSP, 1912, No. 20, p. 142.

[39] OSP, 1910, No. 20, p. 109.

[40] Ibid.

[41] OSP., 1911, No. 20, p. 140.

[42] Ibid., p. 142.

[43] Ibid., p. 152.

[44] OSP., 1913, No. 20, p. 463.

[45] Condron and Crimmins-Gardner, "Public Health Measures and Mortality," 41.

[46] Smith, The People's Health, p. 150.

[47] George Rosen, A History of Public Health (New York, 1958), p. 337.

[48] Smith, p. 150.

[49] George Rosen, "Disease, Debility, and Death," 653.

[50] McKeown, Record and Turner, "Interpretation of the Decline in Mortality," 414.

[51] George Rosen, A History of Public Health, p. 338.

[52] OSP., 1901, No. 33, p. 30.

[53] Phair, "Public Health in Ontario," 75.

[54] Neil Sutherland, Children in English-Canadian Society, (Toronto, 1976), p. 43.

[55] Ibid.

[56] Phair, "Public Health in Ontario," 76.

[57] OSP., 1913, No. 20, p. 143.

[58] OSP., 1911, No. 20, p. 140.

[59] OSP., 1907, No. 36, p. 8.

[60] Phair, "Public Health in Ontario," 78.

[61] McKeown, Record and Turner, "Interpretation of the Decline in Mortality," 414.

[62] Smith, The People's Health, p. 133.

[63] McKeown, Record and Turner, "Interpretation of the Decline in Mortality," 414, 398.

[64] OSP., 1906, No. 36, p. 12.

[65] OSP., 1912, No. 20, p. 143.

[66] OSP., 1913, No. 20, p. 449.

[67] OSP., 1914, No. 21, p. 229.

[68] OSP., 1915, No. 21, p. 227.

[69] OSP., 1915, No. 21, p. 235.

[70] OSP., 1915, No. 21, p. 255.

[71] McKeown, Record and Turner, "Interpretation of the Decline in Mortality," 414; and see Chapter 4, below.

[72] OSP., 1906, No. 36, p. 100.

[73] Ibid.

[74] See Carol Bacchi, "Race Regeneration and Social Purity. A Study of the Social Attitudes of Canada's English-Speaking Suffragists," Social History, XI (Nov., 1978), 460-463, for a discussion of the eugenics versus euthenics debate in Canada in this period.

[75] Ibid., 102.

[76] Carl Degler, At Odds. Women and the Family in America from the Revolution to the Present (New York, 1980), p. 73.

[77] OSP., Reports of the Registrar General, 1890, 1895.

[78] OSP., 1911, No. 20, p. 53.

[79] B.R. Mitchell and Phyllis Deane, Abstracts of British Historical Statistics (Cambridge, 1963), pp. 36-7 as cited in Smith, The People's Health, p. 65.

[80] H.J. Morgan, Canadian Men and Women of the Time (Toronto, 1912), p. 714.

[81] OSP., 1911, No. 20, p. 21.

[82] OSP., 1911, No. 20, p. 11.

[83] Ibid.

[84] OSP., 1911, No. 20, p. 15.

[85] Ibid.

[86] OSP., 1910, No. 20, p. 17.

[87] Carol Dyhouse, "Working-Class Mothers and Infant Mortality in England, 1895-1914," Journal of Social History 12 (Winter, 1978), 254.

[88] Public Health Journal, II (May, 1911), p. 220.

[89] Ibid.

[90] OSP., 1911, No. 20, p. 53.

[91] R. Wodehouse, "Vital Statistics Pertaining to Infant Mortality," Public Health Journal, II (August, 1911), 363.

[92] A.D. Blackader, "The More Important Causes Underlying the Heavy Infantile Death Rate in Large Cities," Public Health Journal, III (July, 1912), 369.

[93] Ibid., 370-371.

[94] OSP., 1914, No. 20, p. 13.

[95] Ibid.

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[97] Dyhouse, "Working-Class Mothers and Infant Mortality," 250.

[98] OSP., 1915, No. 20, p. 9.

[99] Ibid.

CHAPTER III

DISEASE AND MORTALITY II: Hamilton, 1900-1914

> Nature has indeed smiled upon our city. In situation and environment and abundance of all natural advantages we occupy a unique--an almost ideal position. Nevertheless, after having passed with comparative ease and safety through the dangers and diseases of infancy and childhood, we find ourselves, in common with all rapidly growing American cities, face to face, at the threshold of our adult life, with the cancers and plague infections incident to the maturity of most urban communities.[1]

This analysis, and its important conclusions that industrialization produced, or could produce, deterioration in public health, was offered in 1912 by Hamilton's Medical Health Officer, Dr. James Roberts. His opinion was rooted in nearly a decade of daily contact with the problems and issues of public health in an industrial city. More recently, he had witnessed a decline in the general healthfulness of Hamilton's population, in spite of his efforts, as the result of accelerated urban growth.

This chapter will present an analysis of mortality rates for the city of Hamilton, Ontario, 1900-1914, in order to determine whether the city conformed to or differed from the experience of the province of Ontario, in general, and of other major urban centres, in particular, in both general patterns of mortality and in mortality from specific causes. The chapter includes a longitudinal analysis of mortality in Hamilton, 1900-1914, in comparison with other urban areas of the province. It also presents a more intensive analysis of the distribution of mortality by ward in the city in 1910, the year in which mortality levels of 1900-1914 peaked. The analysis demonstrates that during this time, contrary to civic

promoters' claims that Hamilton was one of the healthiest cities on the North American continent, the city appears to have experienced a rise in mortality which Roberts, for one, associated with overcrowding and other adverse results of rapid urban growth. It demonstrates further that this "crisis" was concentrated in those wards of the city which housed a working class and immigrant population.

In computing the mortality rates for Hamilton, data from the Ontario Sessional Papers and the Registrar General's reports has again been used, even though in some cases the figures, especially those for population estimates, vary from those reported by the city of Hamilton in its own assessment records. Estimates of the population of Hamilton from 1906 to 1910 as reported in the Sessional Papers are lower than the assessment data collected by the city itself. Under these circumstances, the data from the Sessional Papers, the official government documents, were used in order to provide consistency with the preceding chapter. As in the analysis of mortality for Ontario and urban areas, stillbirths have been included when calculating mortality rates. The inclusion of stillbirths and the use of population data from the Sessional Papers means that the mortality rates for Hamilton are frequently higher than those recorded at the time by the M.H.O. for Hamilton who, it appears, tried very hard to produce the lowest possible mortality rates. The discrepancy does not, however, interfere with an analysis of general patterns of mortality. The higher rate may, in fact, be more accurate in view of the contemporary claims that under-reporting of deaths approximated a rate of 10 per cent.

Hamilton, Canada, was, in 1900, a thriving industrial centre with

a population of about 50,000. In the last years of the nineteenth century, many new industries had been attracted to the city because of the availability of cheap hydro-electric power and because of its location on both rail and shipping lines. By 1900, the iron and steel industry, encouraged by civic officials, was well established in "the Birmingham of Canada." In 1910, when the major steel producing companies in the country amalgamated to form the Steel Company of Canada, the head offices were located in Hamilton. Shortly after, in 1912, a second large iron and steel manufacturer, Dominion Foundries, located in the city. These major companies along with subsidiaries of American enterprises such as International Harvester and Westinghouse and the many satellite industries that sprang up in their shadows provided employment for the steady influx of British and European immigrants to the city in the latter part of the nineteenth and the early years of the twentieth centuries. By the end of the first decade of the twentieth century, the consequences of the dual processes of industrialization and immigration had created in Hamilton identifiable social problems - not the least of which, ill-health, appears to have been reflected in the city's mortality levels.

At 15.4, Hamilton's mortality rate for 1900 was almost midway between the lower province-wide rate of 12.7 per 1000 population and the higher urban levels of 17.0 per 1000, a pattern which persisted for the next three years. Data is available as well to compare the mortality rates in Hamilton and the urban areas of the province to those of American cities in 1900. (See Tables 11 and 12). Gretchen Condron and Eileen Crimmins-Gardner have examined mortality rates for 26 U.S. cities for the census years 1890 and 1900. From their research, they have concluded

TABLE 11

MORTALITY RATE PER 1,000 POPULATION - HAMILTON 1900-1914

YEAR	
1900	15.4
1901	15.4
1902	14.6
1903	15.3
1904	17.3
1905	17.7
1906	16.8
1907	17.5
1908	18.9
1909	18.1
1910	20.6
1911	14.7
1912	14.0
1913	13.8
1914	12.8

Source: OSP, Registrar General Reports, 1900-1914.

TABLE 12

INFANT MORTALITY - HAMILTON 1900-1914

YEAR	STILLBIRTHS EXCLUDED	STILLBIRTHS INCLUDED
1900	172.5	218.3
1901	152.0	193.5
1902	154.6	196.0
1903	161.4	192.4
1904	108.1	164.3
1905	145.8	198.7
1906	137.4	183.9
1907	124.4	169.9
1908	158.3	191.5
1909	128.6	173.5
1910	125.7	176.1
1911	119.2	173.9
1912	123.6	173.8
1913	114.9	168.7
1914	114.2	156.9

Source: OSP, Registrar General Reports, 1900-1914.

TABLE 13

COMPARISON OF HAMILTON & AMERICAN CITIES FOR SELECTED CATEGORIES OF DISEASE PER 100,000 POPULATION IN 1900

CATEGORY	HAMILTON	BUFFALO	CLEVELAND	DETROIT	AVERAGE U.S. CITIES	ONTARIO CITIES
TYPHOID FEVER	30.4	25.0	48.2	18.9	33.8	32.6
WHOOPING COUGH	1.9	8.2	8.4	8.1	13.2	7.6
DIPHTHERIA	39.9	26.4	51.6	46.9	59.2	58.7
TUBERCULOSIS	205.2	131.7	131.8	125.0	218.1	227.5
DYSENTERY & CHOLERA INFANTUM	181.1*	133.4	111.3	151.2	153.1	202.2
RESPIRATORY (PNEUMONIA)	182.4	158.6	185.7	162.8	241.7	185.0
CANCER	81.7	56.2	54.0	68.3	65.8	69.2
CIRCULATORY	131.1	113.8	130.7	119.7	134.1	120.2
NERVOUS	167.2	162.6	250.4	211.4	206.2	220.5
GENITO-URINARY	55.1	88.8	58.7	75.6	120.0	57.0
OLD AGE	98.8	35.5	55.0	57.4	45.7	114.9
TOTAL	1174.8	940.2	1085.8	1045.3	1290.9	1295.4

*In HAMILTON, this category includes all digestive diseases (i.e. appendicitis, gastritis) but, in any year, most of the deaths in the category were from causes related to dysentery (diarrhea) and cholera infantum.

Source: OSP, Registrar General Report, 1901, Condran, G.A. and E. Crimmins-Gardner, "Public Health Measures and Mortality in U.S. Cities in the Late Nineteenth Century," Human Ecology 6 (1978).

that in many categories of disease mortality decreased from 1890 to 1900 and was a part of a downward trend which continued into the twentieth century.[2] Table 13 compares the mortality rates in Hamilton per 100,000 population for certain specific causes to those for Buffalo, Cleveland and Detroit, Hamilton's sister industrial cities on the Great Lakes, to the average of 26 U.S. Cities and to the urban areas of Ontario. The table indicates that only in the categories of whooping cough and genito-urinary disease were the rates in Hamilton lower than in any other city. There were, however, relatively few deaths from whooping cough while in Hamilton in 1900 the mortality attributable to genito-urinary ailments was only marginally lower than that in Cleveland and the urban areas of Ontario. On the other hand, mortality from tuberculosis, although it did not exceed the U.S. average, was considerably higher in both Hamilton and the urban areas of Ontario than it was in the individual cities of Buffalo, Cleveland and Detroit. In fact, mortality from tuberculosis in Ontario and in Hamilton more closely approximates the rates in those cities for 1890 which were 186.2 for Buffalo, 158.8 for Cleveland and 162.2 for Detroit.[3] Deaths from tuberculosis alone account for most of the difference in the rates between Hamilton and Cleveland and Detroit. No conclusions about the relative health of Hamilton compared to these American cities can be drawn from a comparison of only one year. Nevertheless, the similarity between the overall mortality seems all the more striking because public health officials in Ontario and James Roberts of Hamilton were constant critics of what they regarded as the high mortality rates in American cities, the consequence, in their opinion, of both social and moral evils.

In 1900, as Table 16 shows, the greatest single killer in Hamilton was tuberculosis. At least, 133 of every 1000 deaths were traced to tuberculosis in one or another of its forms. It was followed by respiratory disease at 118.5 per 1000 deaths, nervous diseases, 108.5 and circulatory disease, 85.2. Malformations and diseases specific to infancy accounted for 75.2 of every 1000 deaths, cholera infantum for 58.0, and stillbirths for 59.3. Deaths from these three aspects of infant mortality combined accounted for close to 20 per cent of the total deaths in the city. Mortality from contagious disease, another major killer, totalled 61.7 of every 1000 deaths.

Although data are not available to analyse mortality from individual diseases by ward before 1910, in 1900, the M.H.O., Isaac Ryall, in his final report to the Ontario Board of Health before his death, provided a breakdown of total mortality, excluding stillbirths, by ward for the city. From this information and from population figures for the individual wards, mortality rates for each ward can be computed. (See Table 14, below).

TABLE 14

MORTALITY BY WARD, HAMILTON, 1900

WARD	TOTAL DEATHS	POPULATION	CRUDE DEATH RATE/1000 POPULATION
1	56	5052	11.1
2	74	6132	12.1
3	102	8368	12.2
4	111	7904	14.0
5	102	6478	15.7
6	141	9588	14.7
7	139	9146	15.2
TOTAL	725	52668	AVERAGE: 13.7

Source: OSP, 1901, No. 36, p. 86; Hamilton Spectator, August 16, 1901.

From the table it is evident that, in 1900, mortality varied from ward to ward. Ward 5, in the northern part of the city, bounded by Burlington Bay on the north and King St. on the south, housed workers for nearby heavy industry. It had a mortality rate 40 per cent higher than Ward 1 located in the south part of the city away from the industrial development. Although the differences, as will be pointed out, were much greater by 1910, in 1900 wards 4, 5, 6, and 7 accounted for a proportionately greater part of the mortality of Hamilton than did Wards 1, and 2, which with 37 per cent of the population reported 32 per cent of the total deaths in Hamilton. A reconstruction of the mortality for contagious diseases by ward in 1901 from the scant data available indicates that Ward 5 had the highest mortality in the city from both typhoid and tuberculosis.

TABLE 15

MORTALITY FROM CONTAGIOUS DISEASE BY WARD
IN HAMILTON, 1901, PER 10,000 POPULATION

Ward	Diphtheria	Typhoid Fever	Scarlet Fever	Tuberculosis
1	5.8	0	0	19.3
2	0	0	1.6	19.5
3	2.3	0	0	16.1
4	3.8	2.6	1.3	20.5
5	9.3	4.6	0	23.1
6	7.3	1.0	2.1	14.6
7	4.3	0	0	12.9

Source: OSP, 1902, No. 36, p. 96-97; and Hamilton Spectator, August 16, 1901.

Yet, no one in Hamilton commented on the discrepancies between both the general mortality and mortality from specific causes from ward to ward. While it is tempting to speculate, sufficient data are lacking to support the conclusion that, at the turn of the century, chances for survival in Hamilton were much lower for the working class living in the northern areas

of the city than for those who lived in wards 1, 2, and 3 in the south part of Hamilton.

From 1900 to 1910, mortality rates in Hamilton, as in urban Ontario and throughout the province generally, showed a steady rise from 15.4 in 1900 to 17.7 in 1905, and 20.6 in 1910 before declining by 1914 to a rate significantly lower than that fifteen years earlier, 12.8. An analysis of both the rates per 1,000 deaths and per 10,000 population reveals that, in many cases, before 1914, increases in mortality more than offset the decreases in contagious diseases which may or may not have been the result of the efforts of public health officers in the city. (Tables 16 and 17).

Table 16 records mortality from specific causes for 1900, 1905, 1910, and 1914. Among those diseases which contributed to a rise in mortality, from 1900 to 1905 were diphtheria, whooping cough, nervous and respiratory ailments, genito-urinary diseases and problems such as premature births and malnutrition related to infancy. These increases outweighed decreases from tuberculosis, cholera infantum and typhoid in the same period. A jump ahead five years to 1910 reveals a similar situation. The decreases in mortality from typhoid, diphtheria and whooping cough totalling 5.73 per 10,000 population are insignificant beside a total increase of 35.16 per 10,000 for cholera infantum, nervous, respiratory and circulatory diseases. By 1914, the situation was reversed. Mortality from 1910 to 1914 rose in only three categories, whooping cough, diabetes and deaths related to childbirth totalling 2.68 per 10,000 population. On the other hand, there were large decreases of 81.32 per 10,000 population in mortality from contagious diseases, cholera infantum,

TABLE 16

HAMILTON MORTALITY 1900-1914, ALL CATEGORIES PER 10,000 POPULATION

DISEASE	1900	1905	1910	1914	INCREASE 1900-1914	DECREASE 1900-1914
TYPHOID	3.04	2.39	2.19	.69		2.35
DIPHTHERIA	3.99	5.16	4.27	1.68		2.31
WHOOPING COUGH	.19	1.84		1.80	1.61	
OTHER CONTAGIOUS	2.28	2.03	5.16	1.19		1.09
TUBERCULOSIS	20.51	14.36	14.42	9.09		11.42
CANCER	8.17	7.36	10.68	7.01		1.16
DIABETES	1.13	1.10	.89	1.38	.25	
GENERAL DISEASE	3.23	4.24	5.52	2.27		.96
NERVOUS	16.72	21.91	22.97	12.35		4.37
RESPIRATORY	18.24	20.99	23.33	14.03		4.21
CIRCULATORY	13.11	10.50	19.23	15.71	2.60	
DIGESTIVE	9.88	11.97	13.00	6.72		3.16
CHOLERA INFANTUM	8.93	8.10	13.18	5.14		3.79
GENITO-URINARY	5.51	7.00	8.73	5.83	.32	
PUERPERAL	.57	1.10	.89	1.28	.71	
LOCOMOTIVE		.55	.18	.10	.10	
MALFORMATION	11.40		1.42	1.19	4.22	
OTHER INFANT	.19	17.31	14.60	14.62		
STILLBIRTHS	9.12	15.65	20.66	12.23	5.11	
SKIN	.19	.37	.89	.88	.69	
SUICIDE		.37	.53	.30	.30	
ACCIDENTS	4.94	7.55	8.37	4.34		.60
SENILE DECAY	9.88	11.23	10.51	5.13		4.75
UNDEFINED	2.66	4.23	5.16	1.28		1.38
TOTAL	153.88	177.31	206.78	128.24	15.91	41.55

Source: OSP, Registrar General Reports, 1900-1914.

TABLE 17

HAMILTON: MORTALITY PER 1000 DEATHS, 1900, 1905, 1910, 1914

CATEGORY	1900	1905	1910	1914
TYPHOID	19.8	13.5	9.5	5.4
DIPHTHERIA	25.9	29.1	20.7	13.1
CONTAGIOUS DISEASES	14.8	11.4	25.0	9.2
TUBERCULOSIS	133.3	80.9	69.8	70.9
CHOLERA INFANTUM	58.0	45.7	63.8	40.2
CANCER	53.1	41.5	51.7	54.7
DIABETES	7.4	6.3	4.3	10.8
GENERAL DISEASE	21.0	23.8	26.7	17.7
NERVOUS	108.6	123.6	111.2	96.3
RESPIRATORY	118.5	118.3	112.9	109.4
CIRCULATORY	85.2	59.2	93.1	122.5
DIGESTIVE	64.2	67.5	62.9	52.4
GENITO-URINARY	35.8	39.5	42.2	45.4
LOCOMOTIVE		3.2	.9	.8
SKIN	1.2	2.1	4.3	6.9
MALFORMATION	74.1		6.9	9.3
OTHER INFANT	1.2	97.6	70.8	114.0
STILLBIRTHS	59.3	88.3	100.0	110.9
SENILE DEBILITY	64.2	63.3	50.9	40.0
SUICIDE		2.1	2.6	2.3
ACCIDENT	32.2	42.6	40.5	33.9
PUERPERAL	3.7	6.2	4.3	10.0
WHOOPING COUGH	1.2	10.4		13.9
UNDEFINED	17.3	23.9	25.0	10.0
TOTAL	1000.0	1000.0	1000.0	1000.0

Source: OSP, Registrar General Reports, 1900-1914.

nervous and respiratory diseases. A final comparison of figures for 1900 and 1914 shows that mortality decreased in all categories of contagious disease except whooping cough, which, as noted in the previous chapter, was very unpredictable. Tuberculosis mortality had fallen by fifty per cent while smaller, but still significant decreases are evident in mortality from typhoid fever, diphtheria, nervous, respiratory and digestive disease and cholera infantum. Increases were recorded in deaths attributable to whooping cough, circulatory disease, stillbirths and diseases related to infancy. In fact, over the fifteen year period, deaths from stillbirths and causes related to infancy rose by at least one-third, a figure all the more startling in view of the overall decrease in infant mortality in the city. In the final analysis, the decreases, especially in the categories of contagious diseases, and from tuberculosis, more than offset any increase in mortality from other causes when the years 1900 and 1914 are compared. However, the greater part of this decrease occurred in the last two or three years of the study.

A second and equally revealing approach to a study of mortality in Hamilton is an analysis of the proportion of deaths in each age group from time to time attributable to specific causes. The problem to be resolved here is whether during the period under study there were any distinct and identifiable shifts in the principal causes of mortality among infants, children and adults as revealed by the percentages of deaths in each age group from specific causes at regular intervals - 1900, 1905, 1910 and 1914. Figures for this study were computed for seven age groups: infants, that is, those under 12 months of age at death, ages 1 to 4, 5 to 14, 15 to 29, 30 to 49, 50 to 69 and those over 70.

TABLE 18

MORTALITY BY AGE GROUPS - 1900-1905-1910-1914, HAMILTON

(a) AGE-UNDER 12 MONTHS

CAUSE	% OF TOTAL DEATHS 1900	1905	1910		1914	
DIPHTHERIA	-	-	.5		.4	
TYPHOID	-	-	.8		-	
MEASLES	.9	1.5	1.4		.6	
SCARLET FEVER	-	-	-		-	
WHOOPING COUGH	-	1.1	-		2.2	
TUBERCULOSIS	8.6	-	-		.8	
OTHER GENERAL DISEASES	.5	-	1.7		1.1	
NERVOUS	9.6	9.4	5.4		6.5	
CIRCULATORY	-	-	-		-	
RESPIRATORY	9.6	8.1	6.2		10.7	
DIGESTIVE (C.I)	21.5	14.7	21.5		12.5	
GENITO-URINARY	.5	-	-		-	
MALFORMATION & DEBILITY	27.4	34.1	2.3 23.2	25.5	2.5 31.6	34.1
SKIN	-	-	.3		.2	
STILLBIRTHS	21.0	31.1	32.8		30.7	
ACCIDENTS	.4	-	3.9		.2	
TOTAL	100.0	100.0	100.0		100.0	
TOTAL DEATHS	219	273	354		469	

TABLE 18 (Cont'd)

(b) MORTALITY - AGE GROUP 1-4

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
DIPHTHERIA	15.3	15.6	11.9	10.2
TYPHOID	-	-	-	1.7
MEASLES	6.8	6.7	9.0	1.8
SCARLET FEVER	5.1	2.9	1.7	-
WHOOPING COUGH	1.7	10.1	-	13.7
TUBERCULOSIS	11.9	1.4	.8	3.4
OTHER GENERAL	-	-	1.8	1.7
NERVOUS	15.3	18.7	28.4*	13.5
CIRCULATORY	-	-	3.7	2.8
RESPIRATORY	25.4	33.3	21.0	28.9
DIGESTIVE	8.4	7.2	17.3	11.9
GENITO-URINARY	1.7	-	-	-
MALFORMATIONS & DEBILITY	1.7	1.3	- -	- -
ACCIDENTS	5.1	1.4	2.7	8.6
ILL-DEFINED	1.6	1.4	1.7	1.8
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	59	69	109	59

* Probably due to misdiagnosis of polio during the epidemic of that year.

TABLE 18 (Cont'd)

(c) MORTALITY - AGE GROUP 5-14

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
DIPHTHERIA	23.5	34.1	13.2	16.6
TYPHOID	5.9	-	-	6.3
MEASLES	5.9	-	1.8	2.1
SCARLET FEVER	-	-	1.8	-
TUBERCULOSIS	8.8	14.6	15.1	8.3
OTHER GENERAL	-	2.4	7.5	6.3
NERVOUS	5.9	19.5	22.6	10.4
CIRCULATORY	23.5	7.4	2.0	16.6
RESPIRATORY	8.8	7.4	13.2	6.3
DIGESTIVE	5.9	14.6	9.4	6.3
GENITO-URINARY	-	-	2.0	4.2
ACCIDENTS	5.9	-	9.4	14.5
ILL-DEFINED	5.9	-	2.0	2.1
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	34	41	53	48

TABLE 18 (Cont'd)

(d) MORTALITY - AGE GROUP 15-29

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
DIPHTHERIA	5.1	2.3	1.2	-
TYPHOID	7.6	6.7	7.7	2.3
MEASLES	1.4	-	1.2	-
TUBERCULOSIS	42.6	32.9	37.0	40.3
CANCER	-	-	1.2	2.3
OTHER GENERAL	5.1	3.4	7.7	4.3
NERVOUS	2.6	7.8	6.6	6.8
CIRCULATORY	12.6	2.3	6.6	5.6
RESPIRATORY	3.9	6.7	7.7	4.5
DIGESTIVE	10.1	12.2	7.7	7.8
GENITO-URINARY	-	4.5	4.3	3.5
SKIN	-	-	-	1.2
LOCOMOTIVE	-	-	-	1.2
PUERPERAL	-	2.3	1.2	7.8
ACCIDENTS	7.6	15.5	8.7	11.2
ILL-DEFINED	1.4	3.4	1.2	1.2
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	80	91	92	90

TABLE 18 (Cont'd)

(e) MORTALITY - AGE GROUP 30-49

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
DIPHTHERIA	-	.8	-	.5
TYPHOID	4.8	3.2	-	.5
MEASLES	-	-	-	.5
TUBERCULOSIS	26.7	21.4	19.4	16.3
CANCER	8.6	7.9	9.4	13.2
OTHER GENERAL	5.7	8.7	8.6	6.8
NERVOUS	5.7	4.0	6.5	8.4
CIRCULATORY	12.4	6.3	13.7	11.1
RESPIRATORY	10.5	12.7	10.8	8.9
DIGESTIVE	9.5	11.9	9.4	13.2
GENITO-URINARY	6.7	5.6	8.6	8.4
PUERPERAL	2.8	3.2	2.9	3.2
SKIN	-	.8	.7	-
ACCIDENTS	4.7	10.3	8.6	6.8
ILL-DEFINED	1.9	3.2	1.4	2.2
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	105	126	139	190

TABLE 18 (Cont'd)

(f) MORTALITY - AGE GROUP 50-69

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
TYPHOID	.7	1.8	.3	-
TUBERCULOSIS	8.3	5.3	4.6	4.6
CANCER	17.1	11.7	15.8	11.9
OTHER GENERAL	6.4	5.3	3.1	8.3
NERVOUS	17.6	14.6	13.8	15.1
CIRCULATORY	15.2	12.8	18.4	24.7
RESPIRATORY	12.9	9.9	16.0	18.7
DIGESTIVE	7.6	11.7	6.9	6.4
GENITO-URINARY	5.8	11.1	10.0	11.9
SKIN	.7	-	.7	1.9
LOCOMOTIVE	-	1.2	-	-
OLD AGE	-	1.2	-	2.3
ACCIDENTS	3.2	5.8	6.9	1.9
ILL-DEFINED	4.5	7.6	3.5	2.3
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	159	171	215	218

TABLE 18 (Cont'd)

(g) MORTALITY - AGE GROUP 70+

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
TUBERCULOSIS	1.5	.6	1.1	.9
CANCER	4.9	5.7	6.9	7.2
OTHER GENERAL	.7	3.3	4.8	1.4
NERVOUS	14.0	17.9	10.2	12.2
CIRCULATORY	9.2	12.3	19.3	30.3
RESPIRATORY	15.4	14.6	10.7	14.5
DIGESTIVE	9.2	6.2	6.4	3.1
GENITO-URINARY	7.0	3.9	5.3	4.9
SKIN	-	.6	.5	.9
LOCOMOTIVE	-	.6	-	-
OLD AGE	36.6	31.9	31.6	21.0
ACCIDENTS	1.5	1.2	3.2	3.6
ILL-DEFINED	0	1.2	-	-
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	143	180	187	224

Source: OSP, Registrar General Reports, 1900-1914.

TABLE 19

MORTALITY BY AGE GROUPS FOR 1900-1905-1910-1914
BY CAUSE - URBAN AREAS

(a) AGE UNDER 12 MONTHS (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE DISEASES	2.8	1.8	-	-
GENERAL DISEASES*	8.3	.1	5.3	3.8
NERVOUS	11.8	5.6	4.8	5.9
CIRCULATORY	.1	-	.3	.1
RESPIRATORY	9.4	7.2	7.1	8.3
DIGESTIVE	24.5	17.0	25.4	15.0
GENITO-URINARY	.2	-	.3	.2
SKIN	.2	-	.1	.2
LOCOMOTIVE	-	-	.1	-
DISEASES OF INFANCY	25.7	43.2	25.4	34.6
MALFORMATIONS	-	-	2.9	1.6
STILLBIRTHS	16.8	24.9	23.7	29.9
ACCIDENTS	.2	.2	.4	.3
ILL-DEFINED	-	-	4.2	.1
TOTAL	100.0	100.0	100.0	100.0
TOTAL NUMBER	2338	2656	3943	4633

*Included tuberculosis and in, 1910 and 1914, communicable diseases.

TABLE 19 (Cont'd)

(b) MORTALITY - AGE GROUP 1-4 (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE	38.6	27.9	-	-
GENERAL	13.2	6.1	41.6	32.6
NERVOUS	15.7	15.8	14.3	13.0
CIRCULATORY	1.1	.8	1.3	2.0
RESPIRATORY	20.5	23.4	20.2	20.8
DIGESTIVE	4.9	12.9	14.9	17.5
GENITO-URINARY	.8	.8	.8	1.4
LOCOMOTIVE	-	-	.2	.5
MALFORMATIONS	.8	7.8	-	-
ACCIDENTS	2.8	3.1	3.9	8.3
ILL-DEFINED	1.6	1.4	2.8	3.9
TOTAL	100.0	100.0	100.0	100.0
TOTAL NUMBER	613	511	858	739

TABLE 19 (Cont'd)

(c) MORTALITY - AGE GROUP 5-14 (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE	36.8	29.4	50.3	49.7
GENERAL	13.8	15.3	-	-
NERVOUS	9.1	12.3	10.6	8.9
CIRCULATORY	10.4	11.9	6.8	12.6
RESPIRATORY	9.4	8.9	8.5	5.8
DIGESTIVE	7.8	12.8	9.3	9.6
GENITO-URINARY	1.8	.6	2.9	2.2
SKIN	.3	-	.2	.2
LOCOMOTIVE	1.0	-	.9	.8
ACCIDENTS	8.6	6.4	8.6	9.8
ILL-DEFINED	1.0	2.4	1.8	.4
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	385	327	447	499

TABLE 19 (Cont'd)

(d) MORTALITY - AGE GROUP 15-29 (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE	9.3	7.8	52.7	43.6
GENERAL	47.9	39.2	-	-
NERVOUS	5.4	5.9	6.0	6.2
CIRCULATORY	7.2	6.1	6.7	7.6
RESPIRATORY	6.3	7.7	6.3	7.0
DIGESTIVE	6.4	10.1	6.7	8.4
GENITO-URINARY	3.3	5.3	4.2	5.2
PUERPERAL	2.2	1.9	3.8	6.7
SKIN	.1	.2	.2	.4
LOCOMOTIVE	.3	-	.4	.4
SUICIDE	.8	.8	-	-
ACCIDENTS	8.6	11.5	11.5	13.4
ILL-DEFINED	2.2	3.5	1.5	1.1
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	863	898	1097	1199

TABLE 19 (Cont'd)

(e) MORTALITY - AGE GROUP 30-49 (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE	5.3	3.9	37.9	33.3
GENERAL	39.0	34.3	-	-
NERVOUS	8.7	8.2	8.9	7.9
CIRCULATORY	10.6	11.0	11.3	13.2
RESPIRATORY	8.6	10.3	9.4	11.5
DIGESTIVE	8.7	8.1	6.7	9.4
GENITO-URINARY	5.0	7.7	7.4	7.9
PUERPERAL	2.3	1.8	5.0	3.3
SKIN	.5	.7	.7	.8
LOCOMOTIVE	.1	.3	.1	.3
SUICIDE	1.1	1.1	-	-
ACCIDENTS	5.9	7.1	10.1	10.3
ILL-DEFINED	4.2	5.5	2.5	2.1
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	1038	1190	1573	2047

TABLE 19 (Cont'd)

(f) MORTALITY - AGE GROUP 50-69 (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE	2.4	1.1	28.9	29.4
GENERAL	27.1	24.2	-	-
NERVOUS	19.4	16.6	12.5	12.6
CIRCULATORY	17.0	14.9	20.8	24.0
RESPIRATORY	12.1	12.2	12.7	11.2
DIGESTIVE	7.5	6.8	6.7	6.1
GENITO-URINARY	6.8	9.0	8.5	7.8
PUERPERAL	-	-	-	-
SKIN	.4	.6	.8	1.0
LOCOMOTIVE	.3	.5	.2	-
OLD AGE	-	2.4	-	1.8
SUICIDE	.2	.5	-	-
ACCIDENTS	2.9	4.3	4.9	4.2
ILL-DEFINED	3.9	6.9	4.0	1.9
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	1389	1672	2088	2587

TABLE 19 (Cont'd)

(g) MORTALITY - AGE GROUP 70+ (URBAN ONTARIO)

CAUSE	% OF TOTAL DEATH 1900	1905	1910	1914
COMMUNICABLE	1.6	.8	12.0	12.9
GENERAL	7.7	9.3	-	-
NERVOUS	15.8	16.1	10.5	13.0
CIRCULATORY	7.6	13.4	19.1	23.9
RESPIRATORY	13.3	11.9	11.4	12.2
DIGESTIVE	5.4	5.0	3.8	3.3
GENITO-URINARY	5.6	5.6	5.7	6.5
SKIN	.3	.4	1.1	1.4
LOCOMOTIVE	-	.2	.1	-
OLD AGE	39.4	34.8	31.6	24.2
SUICIDE	-	.1	-	-
ACCIDENT	2.2	1.8	3.6	2.3
ILL-DEFINED	1.1	.6	1.1	.3
TOTAL	100.0	100.0	100.0	100.0
TOTAL DEATHS	1378	1665	2196	2470

Source: OSP, Registrar General Reports, 1900-1914.

The analysis confirms that for certain age groups, the decreases in mortality from contagious diseases, from tuberculosis and from cholera infantum were significant, but that, for other age groups, distribution of mortality from specific disease changed very little during the period (Table 18).

In 1900, the largest categories of mortality for the youngest age group were stillbirths, digestive diseases which included cholera infantum, and those diseases related to infancy, cited as debility and malformations. These medical problems accounted for 69.9 per cent of the total deaths in this age group. Fifteen years later, the total percentage of mortality attributable to these three causes had risen to 77.3 per cent in spite of a substantial decrease in mortality from cholera infantum. [See Table 18 (a)]. A similar situation pertained in the urban areas of the province. Statistics indicate that, in 1900, these diseases accounted for 67.2 per cent of infant mortality, but, by 1914, the proportion had risen to 79.5 per cent. [See Table 19 (a)]. A decrease in mortality attributable to tuberculosis among infants seems to be significant over the fiften years, but this is open to question because, after 1900, many of the deaths from this cause appear to have been recorded under the vague category of debility. In sum, little substantial change in percentages of deaths from specific causes among infants in Hamilton is apparent, in spite of a decrease in overall infant mortality from 180.1 per 1000 live births in 1900 to 114.2 in 1914.

An analysis of the next group, children 1 to 4, similarly reveals little change in the distribution of causes of mortality. In this group, deaths from tuberculosis, which, in 1900, had accounted for 11.9 per cent

of all deaths, fell to 3.4 per cent in 1914, showing one of the largest decreases. Statistics and contemporary reports indicate that in 1914 Hamilton experienced a serious epidemic of measles. Thus, the low percentage of deaths from measles in 1914 is all the more remarkable. On the other hand, the large increases in the percentage of deaths attributable to whooping cough in both 1905 and 1914 demonstrate the erratic nature of the disease. [Table 18 (b)]. The increase in the percentage of deaths from nervous disease in 1910 was also due to an epidemic, in this case a serious outbreak of poliomyelitis. Deaths from poliomyelitis ought to have been recorded under contagious diseases. However, because the category of nervous diseases included deaths attributable to paralysis and spinal disease, both symptoms of polio, deaths from polio were often grouped with those stemming from nervous disorders. Hamilton physicians, confronted as they were with the disease for the first time, probably both misdiagnosed and misreported the mortality from polio in 1910. From 1900 to 1914, the percentage of mortality for those children aged 1 to 4 attributable to contagious disease remained virtually unchanged at 28.9 per cent in 1900, and 27.2 per cent in 1914. Only the percentage of mortality attributable to tuberculosis shows a significant change with the decrease in the percentage of deaths from diphtheria perhaps indicative of some future permanent decrease in the proportion of deaths in this age group from that cause.

For the group of children aged 5 to 14, those of school age, the percentage of total mortality attributable to contagious diseases did decrease over the period from 35.1 per cent of the total in 1900 to 34.1 per cent (all from diphtheria) in 1905, to 16.8 in 1910 to 24.5 per cent

in 1914. [See Table 18(c)]. This appears to be contrary to the situation in all the urban areas of the province and may reflect the successful operation of the program of school visitations devised by James Roberts (see Chapter 4 below).

It is difficult to calculate the percentages of deaths from contagious diseases for each age group in urban areas because, after 1905, contagious diseases were grouped together with general diseases, a category which included tuberculosis. However, these two groups together do not show any significant decrease in urban areas of the province. [See Table 19 (c)]. In Hamilton, the percentage of mortality from tuberculosis, on the other hand, was almost the same in 1914 as it had been in 1900, 8 per cent, although in the intervening years the percentages had risen to 14.6 in 1905 and 15.1 in 1910. As has been seen with the age group 1 to 4, the percentage of mortality attributable to nervous disease increased in 1910, probably a consequence of polio. The largest increase in the percentage of mortality from any specific cause appears to have been in the category of accidental deaths which increased from 5.8 per cent of the total in 1900 to 14.5 per cent of the total in 1914. As Table 18(c) indicates in these years deaths from accidental causes were particularly characteristic of the age cohorts 5-14. This is, perhaps, an indication of the growing physical hazards, for children, of life in the city.

For young adults, 15 to 29, as well, the percentage of deaths from tuberculosis remained relatively constant in the years studied, at 42.5 per cent in 1900, 32.9 per cent in 1905, 37.0 per cent in 1910 and 40.2 per cent in 1914. [See Table 18(d)]. Tuberculosis was by far the major cause of death in this age group throughout the entire period.

The largest decrease was in the category of contagious disease which accounted for 13.8 per cent of the total deaths in 1900, 8.8 per cent in 1905, 8.7 per cent in 1910 and only 2.2 per cent in 1914. When the percentages for tuberculosis and for contagious disease are totalled, the figures are almost exactly the same as those recorded for all urban areas of the province for the category which included these diseases. In 1900, the percentages were 56.3 for Hamilton and 57.2 for urban areas; in 1914 they were 42.4 and 43.6 respectively. One other cause of death worth noting for this age group is that of deaths attributable to childbirth complications, that is blood poisoning, puerperal fever and convulsions resulting from toxemia. In 1900, there were no deaths from this cause, while in 1914, 7 deaths related to childbirth were recorded. If the total deaths in this age group were divided evenly between males and females, these seven deaths would account for at least 15 per cent of all deaths for females aged 15-29. An increase in this category from 2.1 per cent to 6.7 per cent appears in urban areas as well. [See Table 19(d)].

In the age group 30 to 49 the most noticeable change in the percentages of mortality from specific causes occurred with regard to tuberculosis which, in 1900, accounted for 26.7 per cent of all deaths, and in 1914, 16.3 per cent. Increases in the percentages of mortality occurred for cancer, digestive and nervous diseases and for mortality from causes related to the genito-urinary system. [See Table 18(e)]. A decrease in the percentage of deaths attributable to tuberculosis is also apparent in the next age group, adults 50 to 69. [See Table 18(f)]. However, a large increase occurred over the period in the percentage of deaths from circulatory disease, possibly as a result of more accurate

diagnosis of such ailments.[4] In addition, the percentage from genito-urinary causes more than doubled during the period. Most of these deaths (17 of 23 in 1914) were attributed to Bright's Disease, a kidney ailment which defied treatment until the introduction of dialysis procedures in the 1960's.

Among those over 70 who died, the largest change occurred in the category of circulatory disease which increased from 9.1 per cent of the total mortality in 1900 to 30.1 in 1914. However, the percentage of deaths attributable to old age, or "senile debility" as it was termed, declined from 36.4 to 21.0 over the period and this evidence of more accurate diagnoses may explain the upsurge in mortality from circulatory and other disorders for this age group. [See Table 18(g)]. A similar pattern can be seen in urban areas of the province where the percentage of mortality attributable to circulatory disease increased from 7.6 per cent in 1900 to 23.9 per cent in 1914 and deaths attributable to old age decreased from 39.4 to 24.0 per cent over the same period. [(See Table 19(g)].

This analysis confirms that most of the significant decrease in the percentages of deaths attributable to certain categories of disease for specific age groups occurred in the areas of tuberculosis, contagious diseases and cholera infantum, or digestive disease, among infants. Increases appear notably in the categories of circulatory disease for the oldest age groups, accidents among the young, deaths related to childbirth for young women, and stillbirths and other diseases related to infancy. These increases are mirrored in the statistics for all urban areas of Ontario. Overall, few major shifts occurred in the percentages of mortality

attributable to specific causes in these age groups. Although general mortality as reflected in the death rate for Hamilton had decreased over the period 1900-1914, the proportion of deaths attributable to any specific cause, among each age group, remained relatively constant.

Another way to study mortality in Hamilton is by an indepth analysis of the mortality and related statistics for one year. The data for 1910 permit a reconstruction of the distribution of deaths in Hamilton by geographical location within the city, and to a lesser degree, by age, sex and occupation. These variables allow a more detailed recreation of the health of Hamiltonians and may, perhaps, answer the question of whether socio-economic factors were important in determining patterns of mortality in Hamilton. To some extent, the choice of 1910 prejudices the results of this micro-analysis because 1910 was scarcely a typical year in the demographic history of Hamilton. Nevertheless, an analysis of a year with seemingly high levels of mortality is important for an understanding of mortality levels in the city during a critical period when urban expansion, immigration and economic recession all affected the city in various ways. It may be argued that in 1910 this related set of socio-economic problems came to a head and that a study of disease and mortality viewed in this context focuses on those problems as sources of contemporary as well as historical concern.

There are 1055 deaths in the 1910 case study. The data were coded from death certificates issued from January 1 to December 31, 1910. The study excludes persons residing outside the city who died within the city limits. Records of such deaths were never included by the M.H.O. in his annual reports. Nor does it include people from

Hamilton who might have died elsewhere and who, theoretically, the M.H.O. should have counted. These records are simply not available. The cases were coded for age, sex, cause of death, address, and occupation of the deceased or of the deceased's parents. Addresses were located in the appropriate wards, using the 1911 city directory and a 1911 map of Hamilton. It was possible to identify 888 of the cases with a ward code. Many of those cases without a ward code were people who died in charitable institutions, such as the Aged Women's Home or the Salvation Army House of Refuge, but a large group have no address at all.

It is difficult to calculate the general mortality rate for Hamilton in 1910 in any unquestionably accurate manner because of aforementioned discrepancies in population estimates. The data from the Registrar General's report for 1910 which estimated the population at 56,155, yield a mortality rate of 20.0 per 1000, stillbirths included, the highest rate recorded over the fifteen years under study. These population estimates are, however, lower than those issued by the city's assessment department which for the years 1906 to 1910, in particular, reported higher population figures. In fact, the Registrar General, in 1909, admitted that the recorded mortality estimates prepared by his department might be too high because of a difference between the figures for the estimated population cited in his report and in the census population. The use of low population figures could, he suggested, increase mortality rates by as much as 3.0 per 1000 population.[5] On the other hand, the assessment data for Hamilton may be just as open to question as that generated by the Registrar General.

Assessment reports for Hamilton recorded a population of 67,268

on October 1, 1909, a figure which was greeted with cries that the city must be the victim of "race suicide" because the number of children in the city was dropping.[6] In October, 1910, when the new assessment figures were released the estimated population for the year was reported as 73,538 while the population for the previous year was entered as 70,358, a figure considerably higher than had been recorded in October, 1909.[7] The figure of 57,000 used by the Registrar General's report may very well be too low, but just what the population of Hamilton was in any given year remains problematical. If a population of 67,268 and the deaths reported in the sessional papers are used, the resulting mortality rates,17.68 per 1000, including stillbirths, and 15.52 without,are still higher than the rate of 15.4 including stillbirths recorded in 1900 when there was little difference between the figures cited by Hamilton and by the province in their calculations.

The possible underreporting of the population did not escape the notice of Dr. James Roberts. In his annual report for 1910, he pointed out to his readers that the use of low population estimates by the provincial Board of Health had resulted in an inaccurate mortality rate for Hamilton. Roberts' own figure for mortality in Hamilton in 1910 was 13.81 (excluding stillbirths) per 1000 of population. It was based on 1,021 deaths from November,1909 to October, 1910, using the highest population figure available, 73,538, a figure, which must be used in this study as well because it has been broken down in the assessment records into the population for each ward. At 13.8, Roberts argued, Hamilton's mortality rate compared favourably with the most recent figure available for the province, that is, 14.6 for 1908. The provincial rate cited by

Roberts is almost identical to the rate of 14.7, including stillbirths calculated in this study. In his own computations for Hamilton, Roberts appears to have removed stillbirths in order to achieve a lower mortality. Roberts was, however, aware that the use of assessment data was not without its pitfalls. In 1913, he admitted that the figure of 100,000 population quoted by the assessment department as the population of the city for 1913 was "probably ... in excess of the population at the beginning of the statistical year."[8] It was, nevertheless the figure chosen by Roberts in his own compilation of data. For the purposes of this study, overemphasis on statistical data per se is to be avoided, but these incidents serve to illustrate how statistics might be, and, in fact, were, manipulated to produce mortality rates that would reflect favourably upon the state of the city's health.

The Registrar General's reports have been used, as well, to calculate infant mortality for Hamilton. No alternative record of births in the city is available for the period. Here again, Dr. Roberts questioned the reliability of the Registrar General's estimates, claiming that the reported birth rate of the province was too high.[9] Using the statistics from the 1910 death certificates and the number of births for 1910 reported in the Registrar General's report, an infant mortality rate of 116.4 per 1000 live births, stillbirths excluded, is obtained and 167.1 including stillbirths. These rates are slightly lower than those using data from the sessional papers alone which were 125.7 without stillbirths and 176.1 including stillbirths (See Table 12) and considerably lower than the overall urban rates of 168.7 and 210.1 respectively. However, only two years before, in 1908, the rates for infant mortality in Hamilton had

stood at 158.3, stillbirths excluded, and 191.5 including stillbirths. Thus, the decrease in infant mortality was of recent origin and while, in relation to other urban areas, the rates might appear to be low, when compared to the mortality in other parts of the western world, they do not seem quite as satisfactory. Australia, for example, recorded in 1910 an infant mortality rate of 75 per 1000 births, New Zealand, 63, and England and Wales, where campaigns to reduce infant mortality had been waged for the past ten years, a rate of 105.[10] On the other hand, the rates in Hamilton fall far short of those estimated by Terry Copp in his survey of Montreal for the same period. Copp found that between 1897 and 1911 approximately one in every three babies died before its first birthday.

More than 30 per cent (31.8) of all deaths (including stillbirths) in this study of mortality occurred among those under one year of age. It is appropriate then to begin an analysis of mortality in Hamilton in 1910 with a study of infant death, the largest single component of mortality in the city. There were, in 1910, 234 infant deaths, excluding stillbirths. Of these, 70 per cent died in the first six months of life, and 28.6 per cent before the end of the first month. Few comparable studies exist for any other areas of Canada. Terry Copp has argued that contrary to most cities, where the highest percentage of deaths occurred in the first month after birth, the most critical period for babies in Montreal was from one to six months. Copp's data, however, is so overgeneralized that comparison of infant mortality in the two cities is impossible.[11] Twenty-five deaths, or 37 per cent of all infant mortality in Hamilton, occurred in the first month of life and were attributable to prematurity, which, in 1910, was not amenable to treatment. Another 41.4 per cent of infant deaths occurred

between 1 and 6 months and 30 per cent in the last six months. Put another way, 7 of every 10 infant deaths in Hamilton occurred in the first six months of life; 3 of 10 in the last six months of the first year. (Table 20). Infant mortality statistics can also be broken down by sex. Statistics for Hamilton in 1910 conform to other studies which show a slightly higher ratio of male to female infant mortality. The rates of 55.1 males to 44.9 females are almost identical to a 1937 U.S. study that reported a rate of 56.7 for males and 44.5 for females.[12]

TABLE 20

INFANT MORTALITY BY AGE AND SEX - HAMILTON - 1910

AGE AT DEATH	NUMBER MALE	NUMBER FEMALE	TOTAL BOTH SEXES	PERCENTAGE
UNDER 1 MONTH	40	27	67	28.6
1- 3 MONTHS	30	18	48	20.6
4- 6 MONTHS	26	23	49	20.9
7-12 MONTHS	33	37	70	29.9
TOTAL	129	105	234	100.0
PERCENTAGE	55.1	44.9	100	

Source: Hamilton Death Certificates, 1910.

There appears to be some correlation between certain areas of Hamilton and infant mortality. An examination by ward of causes of death per 1000 deaths serves to point out some significant differences in the percentage of deaths attributable to stillbirths and diseases of infancy. (See Table 21). These rates do not include those infant deaths which were the result of causes other than those related specifically to infancy, i.e. prematurity, deformity and general debility, and cholera infantum.

TABLE 21

DEATHS BY WARD BY CAUSE PER 1000 DEATHS, HAMILTON, 1910

CATEGORY	WARD 1	WARD 2	WARD 3	WARD 4
CONTAGIOUS DISEASES	44.8	54.5	58.8	67.3
TUBERCULOSIS	59.8	72.8	88.2	48.1
CANCER	29.8	72.8	58.8	67.3
STILLBIRTHS, INFANCY DISEASES	373.1	163.6	308.8	317.3
RESPIRATORY	44.8	109.1	88.2	134.6
ACCIDENTS	14.9	72.7	22.1	48.1
GENERAL	74.6	145.4	66.2	28.8
NERVOUS, CIRCULATORY & DIGESTIVE	313.4	272.7	257.4	250.0
OLD AGE	44.8	36.4	51.5	38.5
TOTAL	1000.0	1000.0	1000.0	1000.0

CATEGORY	WARD 5	WARD 6	WARD 7	WARD 8	ALL WARDS	"TRANSIENTS"
CONTAGIOUS	55.5	62.5	94.5	107.4	70.5	70.1
TUBERCULOSIS	101.8	62.5	78.7	50.0	70.5	93.6
CANCER	46.4	56.3	47.2	33.1	51.3	46.8
STILLBIRTHS, INFANCY DISEASES	361.1	387.5	291.3	388.3	334.9	216.3
RESPIRATORY	101.8	106.3	118.2	99.2	102.5	82.0
ACCIDENTS	64.8	31.2	-	41.2	34.2	82.0
GENERAL	46.4	75.0	86.6	66.0	69.5	110.9
NERVOUS, CIRCULATORY & DIGESTIVE	185.2	200.0	252.0	214.8	235.8	251.5
OLD AGE	37.0	18.7	31.5	-	30.8	46.8
TOTAL	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0

Source: Hamilton death certificates, 1910; Hamilton City Directory, 1911.

TABLE 22

DEATH BY WARD BY CAUSE PER 10,000 OF POPULATION, HAMILTON, 1910

CATEGORY	WARD 1	WARD 2	WARD 3	WARD 4
CONTAGIOUS DISEASES	3.8	4.6	7.1	6.9
TUBERCULOSIS	5.1	6.2	10.6	5.0
CANCER	2.6	6.2	7.1	6.9
STILLBIRTHS, INFANCY DISEASES	31.9	13.9	37.2	32.7
RESPIRATORY	3.8	9.2	10.6	13.8
ACCIDENTS	1.3	6.2	2.7	5.0
GENERAL DISEASE	6.4	12.3	8.0	3.0
NERVOUS, CIRCULATORY & DIGESTIVE	26.8	23.1	31.0	25.8
OLD AGE	3.8	3.1	6.2	4.0
TOTAL	85.5	84.8	120.5	103.1

CATEGORY	WARD 5	WARD 6	WARD 7	WARD 8	ALL WARDS
CONTAGIOUS	8.2	8.8	11.7	14.6	8.4
TUBERCULOSIS	15.1	8.8	9.7	6.7	8.4
CANCER	6.9	7.9	5.8	4.5	6.1
STILLBIRTHS, INFANCY DISEASES	53.5	54.6	36.0	52.7	40.0
RESPIRATORY	15.1	15.0	14.6	13.5	12.2
ACCIDENTS	9.6	4.4	-	5.6	4.1
GENERAL DISEASE	6.9	10.6	10.7	9.0	8.3
NERVOUS, CIRCULATORY & DIGESTIVE	27.5	28.2	31.2	29.2	28.1
OLD AGE	5.5	2.6	3.9	-	3.7
TOTAL	138.3	140.9	113.6	125.8	119.3

Source: Hamilton, Death Certificates, 1910; City Directory, Hamilton, 1911.

NOTE: The total of all Wards excludes 177 "transients" with no address.

Deaths from contagious disease and respiratory, nervous and circulatory ailments are excluded. The rates vary from a low of 163.6 per 1000 deaths in Ward 2 to a high of 387.5 in Ward 5. Only Wards 2 and 7 had a rate lower than 300 per 1000 deaths. The mortality from stillbirths and causes related to infancy per 10,000 population by ward exhibits a similar pattern. The average for all wards was 40.0 per 10,000 (See Table 22). Wards 5, 6 and 8 had higher rate, 53.5, 54.6 and 52.7 respectively while the rate for Ward 2, 13.9, was much lower. These rates are not, however, age-specific and although they may serve as indicators of differences within the city, no conclusion about the nature of infant mortality can be drawn on the basis of these statistics alone.

In spite of this reservation, there appears to be some degree of correlation between the socio-economic conditions in the wards and the rates of infant mortality. Ward 2, for example, with the lowest infant mortality rate, had the highest average per capita values for taxable real property, $1157.00, of any ward in the city. Wards 6 and 8 with high mortality rates had low averages of taxable real property at $451.10 and $399.90 respectively.[13] The study is not conclusive because Ward 7 with the lowest property assessment per capita, $384.20, had a low infant mortality rate. This may be, in part because of the large number of young single men supposedly living in the ward. Again inferences from this study must be limited because of the lack of age-specific data.

There are no available records from which to compile the number of births per ward. The assessment records underestimate the number of births by more than one-half. As a result, it is not possible to compute infant mortality rates per 1000 live births by ward. Some further

comparison of infant mortality in each ward can be made by determining what percentage of the total infant deaths in Hamilton occurred in each ward. For example, Ward 2 with the lowest percentage of the total population, 8.8, had the lowest percentage of the total infant mortality, 2.8 per cent. (See Table 23) Ward 1 likewise had a low rate. Wards 5, 6, and 8, on the other hand, which housed 35.9 per cent of the population recorded 49.4 per cent of the total infant deaths in the city. If still-births are excluded, as perhaps they should be when trying to establish a correlation between infant mortality per se and socio-economic conditions, the percentages change slightly. Wards 5, 6, and 8 had 46.9 per cent of the total infant mortality and Ward 3, which had a low incidence of still-births, recorded 18.1 per cent of the total infant mortality. At one end of the scale, Wards 1 and 2 with 19.4 per cent of the population had 8.1 per cent of the infant mortality. At the other extreme, 53.5 per cent of the infant deaths occurred in Wards 3, 6, and 8, an area encompassing 43.0 per cent of Hamilton's population. Again, conclusions must be limited because of the lack of age-specific data for each ward.

Infant mortality in Hamilton is susceptible as well to an analysis by specific cause. Historically, the components of infant mortality which have been linked with any validity to social conditions are malnutrition, cholera infantum and what was simply termed "wasting" or debility, often categorized in Ontario, and in Hamilton, as marasmus. According to George Rosen, infant mortality, more than any other category of disease, is a sensitive indicator of environmental conditions such as housing, sanitation, nutrition and good water.[14] Inadequate housing and especially overcrowding,

accompanied by a lack of sanitary amenities, Rosen argued, increased the risks of gastrointestinal disease. Again, reliable figures are lacking, but in a very rough way, it has been possible to estimate the population density in each ward based on its size and population, in an effort to correlate socio-economic conditions with mortality. Wards 1 and 2 had the lowest density of about 4,000 and 5,000 persons per square mile respectively. Ward 8 also had a relatively low density in 1910 because of its geographical size. That area of Hamilton had just been annexed by the city. Although the ward was large, most of the population, in 1910, seems to have been concentrated in the western edge of the ward, adjacent to Ward 7 and close to the factories where the occupants of the ward were employed. Wards 3 and 4 had about 10,000 persons per square mile; Ward 5, 13,000. Wards 6 and 7 appear to have had the highest population density at about 16,000 persons per square mile, figures quite consistent with contemporary accounts of living conditions in Hamilton in this period. It is difficult to make comparisons to other areas of urban Ontario, but it seems that at least some parts of Hamilton had a population density the equal of American urban centres at the turn of the century. Boston, for example, recorded a density of 12,358 per square mile in 1900.[15]

Cholera infantum and diarrhoeal diseases have frequently been cited as the leading causes of infant mortality. Public health officials of the day gave the credit for improved infant mortality to the clean milk campaigns waged in urban areas in the early years of the twentieth century and M. Beaver, in his study of the problem in Britain, agrees with this diagnosis.[16] In Hamilton, mortality attributable to cholera infantum as noted accounted for a large percentage of the total infant deaths, but,

TABLE 23

INFANT MORTALITY BY WARD - 1910

CAUSE	WARD 1	2	3	4	5	6	7	8	TOTAL
CONTAGIOUS	1	1	3	3	1	3	4	5	21
TUBERCULOSIS			1			1			2
STILLBIRTHS	15	3	5	5	14	25	14	11	92
INFANT CAUSES	10	6	37	28	25	37	23	36	202
RESPIRATORY	1		2	4	3	4	2	2	18
ACCIDENTS				1					1
GENERAL					1				1
NERVOUS & CIRCULATORY	2		4	2		4	1	2	15
TOTAL	29	10	52	43	44	74	44	56	352
PER CENT	8.2	2.8	14.8	12.3	12.5	21.0	12.5	15.9	100.0
% EXCLUDING STILLBIRTHS	5.5	2.8	18.3	14.6	11.6	18.2	11.6	17.4	100.0

Source: Hamilton Death Certificates, 1910.

TABLE 24

INFANT MORTALITY FROM CHOLERA INFANTUM AND DIARRHOEAL DISEASE
HAMILTON, BY WARD, 1910

	WARD 1	2	3	4	5	6	7	8	TOTAL
NO. OF DEATHS ATT. TO CHOLERA INFANTUM	4	3	11	7	8	16	8	18	75
TOTAL INFANT DEATHS, EXCLUDING STILLBIRTHS	14	7	47	38	30	49	30	45	260
CHOLERA INFANTUM AS % OF TOTAL	28.6	42.9	23.4	18.9	26.7	32.7	26.7	40.0	28.8

Source: Hamilton Death Certificates, 1910.

again, the percentages varied from ward to ward (See Table 24). Curiously, Wards 1 and 2 did not have the lowest percentage of deaths from cholera infantum and diarrhoeal diseases. In fact, the highest figure, 42.9 per cent of total infant mortality was from these causes in Ward 2. Ward 4, where cholera infantum accounted for 18.9 per cent of the total infant mortality, had the lowest rate. That mortality from cholera infantum might well be higher in the more affluent areas of a city was confirmed by the study, mentioned in the previous chapter, undertaken by the M.H.O. for Ft. William in 1910, who argued that in the more prosperous parts of his city mothers had abandoned breastfeeding, "the antidote for this condition of affairs,"[17] in favour of the less hygienic bottle. It is possible that in Hamilton too, the middle class women who predominated in Wards 1 and 2 had adopted the less sanitary, but more socially convenient method of bottle feeding. In so doing, they may, nevertheless, have decreased their infants' chances of surviving the first year of life. Carol Dyhouse, in her study of working class mothers and infant mortality in the same general time span in Britain, suggests that up to 80 per cent of working class mothers were still breastfeeding their infants, partly because it was an inexpensive method of feeding.[18] There is little reason to suppose that the situation was any different in working class Hamilton. This particular problem is amenable to further analysis.

A number of infant deaths in Hamilton in 1910 were attributed on the death certificates to malnutrition. Twelve per cent of the total deaths among infants, excluding stillbirths, were attributed to malnutrition or to marasmus. Twenty-five per cent of these deaths were in Ward 8, and 81 per cent of the total deaths occurred in Wards 4 to 8 which represented

65 per cent of the population and had the highest population densities. Here again, but in sharp contrast to mortality from cholera infantum, the mortality from this cause was negligible in Wards 1, 2, and 7, two of which had the lowest population densities in the city. High population density and its implications may explain, in part, the variations in infant mortality from most causes in Hamilton in 1910, but the low rates in Ward 7, located as it was in the northern industrial sector, remain a puzzle until an age-specific study of mortality in the city can be undertaken. Nevertheless, it is clear that of all causes of infant mortality, cholera infantum was the only one which affected all areas of the city and this fact may help to explain the impetus for the clean milk campaign in Hamilton, led as it was by middle class women whose own lives may have been touched by cholera infantum.

Some of the data were also susceptible to a very limited study of mortality for infants and children under 5 by parents' occupation. Seventy-five death certificates in this age group indicated the occupation of a parent, most often that of the father. Occupations were divided into eight categories. In seven of these, deaths were recorded. (See Table 25). The highest percentages of mortality, 25.7 per cent of the total deaths, were among children of unskilled workers. Deaths among children of skilled workers followed at 18.9 per cent. Only 5.4 per cent of deaths were recorded for children of professionals and none among children of public servants. The total number is, however, very small and there is no indication why the parental occupation was left blank in so many cases, when the certificates were filled out by a number of different physicians.

TABLE 25

INFANT AND CHILD MORTALITY (TO AGE 5) BY PARENTS' OCCUPATION, HAMILTON, 1910

CAUSE	TRANS-PORT	COMMERCE	PROFES-SIONAL	UNSKILLED	SKILLED	PUBLIC SERVANT	SEMI-SKILLED	CONST-RUCTION	TOTAL
DIPHTHERIA	1			2					3
MEASLES		1		1					2
OTHER CONTAGIOUS	1			1				1	3
NERVOUS		1		1	1		1		4
TUBERCULOSIS				1					1
WHOOPING COUGH								1	1
RESPIRATORY				2	1				3
CIRCULATORY					1				1
CHOLERA INFANTUM	2			7	3		3	1	16
MALFORMATION				1	1			1	3
OTHER INFANT	2	4	3	3	4		3	5	24
STILLBIRTHS	4	2	1		3		2	1	13
TOTAL	10	8	4	19	14	0	9	10	74
%	13.5	10.8	5.4	25.7	18.9	0	12.2	13.5	100.%

Source: Hamilton, Death Certificates, 1910.

Finally, the structure of the statistics may only be a reflection of the distribution of occupation for the entire population of Hamilton in 1910.

Children aged 1 to 4 years were at much less risk than were infants. Fifty-five, or 6 per cent of the total deaths, in Hamilton where address were available were recorded in this age group. Of these deaths, 36.4 per cent were the result of some contagious disease. Respiratory ailments accounted for 29.1 per cent of the mortality and circulatory, digestive and nervous disorders together for 25 per cent. (See Table 26). Only a small percentage, 1.8, were the result of tuberculosis. A breakdown of these deaths by ward reveals a distribution pattern like that for infant mortality. Wards 1 and 2 together recorded 7.5 per cent of the total deaths; Ward 8 alone, 27.3 per cent and Wards 5, 6, 7 and 8 collectively 66 per cent. However, again age-specific data is unavailable to substantiate any definitive conclusions that mortality among this age group was higher in the working class areas of the city than in the less densely populated wards.

Estimates in the assessment records of the age group 5 to 21 permit an analysis of age-specific mortality by wards for this large age group utilizing data. This segment of the population is usually considered to be the healthiest group and in Hamilton, in 1910, only 64, or 7 per cent of the total deaths occurred among this age group. Of these deaths, 26.5 per cent were the result of tuberculosis, 20.0 of contagious disease and 15.6 of accidents. The highest rate of mortality calculated per 10,000 population for this group was in Ward 8, 48.1. This figure is more than double that in Ward 1, 22.6. (See Table 27). Wards 5, 6, 7, and 8 all had rates in excess of 40.0 per 10,000 population. Wards 5, 6,

TABLE 26

MORTALITY, CHILDREN 1-4, BY WARD & CAUSE

CAUSE	WARD 1	2	3	4	5	6	7	8	TOTAL	PER CENT
CONTAGIOUS	1		3	1	4	4	4	3	20	36.4
TUBERCULOSIS		1							1	1.8
RESPIRATORY			2		4	1	5	4	16	29.1
ACCIDENTS								1	1	1.8
GENERAL	1						2		3	5.5
CIRCULATORY, NERVOUS & DIGESTIVE		1		3	2	1		7	14	25.4
TOTAL	2	2	5	4	10	6	11	15	55	100.0
PERCENTAGE	3.6	3.6	9.1	7.3	18.2	10.9	20.0	27.3	100.0	

Source: Hamilton, Death Certificates, 1910.

TABLE 27

MORTALITY PER 10,000 POPULATION BY WARD AGE 5-21, HAMILTON, 1910

WARD	POPULATION 5-21	NUMBER OF DEATHS	RATE/10,000 POPULATION
1	1769	4	22.6
2	1202	4	33.3
3	2578	7	27.2
4	2579	9	34.9
5	1709	7	40.9
6	2877	12	41.9
7	2370	11	46.4
8	2078	10	48.1
TOTAL	17162	64	37.3

Source: Hamilton, Death Certificates, 1910.

and 7, were the more densely settled wards in the city, while that part of Ward 8 nearest to the industrial sector may have been no less crowded with newcomers to the city. This data suggests a significant relationship between high population density and high mortality rates in Hamilton in 1910.

This age-specific analysis of the group 5 to 21 extends past childhood and into adulthood. However, age sixteen was chosen, in the context of the micro-analysis of Hamilton, 1910, as the beginning of adulthood. Moreover, the age of sixteen in Hamilton in 1910 was somewhat of a watershed. Approximately 50 per cent of all deaths in Hamilton occurred before age 16 and 50 per cent after. In young adulthood, ages 16 to 44, the greatest single killer, as already noted, was tuberculosis. In Hamilton in 1910, this was true for both males and females. (See Table 28). At least 28.1 per cent of all deaths for those aged 16 to 44 were from tuberculosis and the rate was likely higher because of under-reporting. F.B. Smith points out that in Britain, because of the social stigma attached to the disease, a "kindly doctor" might be inclined to report tuberculosis as pneumonia or another respiratory ailment.[19] It is impossible to calculate from the number of deaths due to tuberculosis how many total cases there were in the city in any given year, unlike other contagious disease for which morbidity as well as mortality statistics were recorded by the M.H.O. After the laboratory was established in 1910, the number of laboratory examinations conducted to determine the presence of tubercle bacilli was reported. For example, in 1910-1911, there were 328 tests, but there is no indication just how many of these were positive. Thus, it is impossible to calculate the total socio-

TABLE 28

(a) MORTALITY - BY CAUSE - FEMALES - HAMILTON, 1910

CATEGORY	AGE 16-29		30-45		46-59	
	Number	%	Number	%	Number	%
CONTAGIOUS	4	10.0				
TUBERCULOSIS	15	37.5	12	25.4	3	6.8
CANCER	1	2.5	3	6.4	5	11.4
RESPIRATORY	2	5.0	2	4.3	9	20.5
ACCIDENTS	4	10.0	3	6.4		
GENERAL INC. PUERPERAL	5	12.5	10	21.3	7	15.8
CIRCULATORY, NERVOUS & DIGESTIVE	9	22.5	17	36.2	20	45.5
TOTAL	40	100.0	47	100.0	44	100.0

(b) MORTALITY - BY CAUSE - MALES - HAMILTON, 1910

CATEGORY	AGE 16-29		30-45		46-59	
	Number	%	Number	%	Number	%
CONTAGIOUS	6	16.7	2	3.8		
TUBERCULOSIS	13	36.1	12	23.0	5	9.8
CANCER	1	2.8	3	5.8	8	15.7
RESPIRATORY	2	5.5	7	13.5	3	5.9
ACCIDENTS - ILL-DEFINED	4	11.1	8	15.4	7	13.7
GENERAL	1	2.8	11	21.2	9	17.6
CIRCULATORY, NERVOUS & DIGESTIVE	9	25.0	9	17.3	19	37.3
TOTAL	36	100.0	52	100.0	51	100.0

Source: Hamilton, Death Certificates, 1910.

economic impact of tuberculosis on families where the wage earner or the mother was stricken by this debilitating disease which might take two to five years to run its course, years during which the victim was frequently unable to hold a regular well-paying job. Only in the age group of adults over 45 did mortality from some other cause exceed that for tuberculosis. Among women aged 16 to 29, tuberculosis accounted for 37.5 per cent of mortality; for women, 30 to 45, 25.5 per cent, while for men in the same age groups the percentages were 36.1 and 23.1 respectively.

An analysis of mortality for the age group 16 to 59 by ward (see Table 29) shows that once again, for almost every category, Wards 5, 6, 7 and 8 accounted for the largest percentages of mortality, with the percentage of mortality in Wards 5 and 6 more than double that in Wards 1 and 2, although as noted the population in Wards 5 and 6 was not double that of Wards 1 and 2. As with the age-specific study for the age group 5 to 21, the data for distribution of mortality by wards, ages 16 to 59, correlates with the rough estimates of population density.

A study of adult mortality by occupation did not produce a clear cut relationship between occupation and mortality. One hundred and eighty-nine adult death certificates provided data about the occupation of the deceased. (Table 30). Of those 189 cases, 42, or 22.2 per cent died from tuberculosis, a figure almost identical to that among all adult males, aged 16 to 59. Sixteen or 42 per cent of these deaths occurred among skilled workers. Circulatory disease followed with 30 cases, or 15.9 per cent of all deaths. Nearly 25 per cent of deaths from this cause were recorded for those engaged in commerce, occupations which ranged from salesmen and bookkeepers to barbers and bartenders.

TABLE 29

MORTALITY - AGES 16 TO 59 BY WARD AND CAUSE: HAMILTON, 1910

CAUSE	WARD 1		WARD 2		WARD 3		WARD 4		WARD 5		WARD 6		WARD 7		WARD 8		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
CONTAGIOUS DISEASES					1	11.1	1	11.1	1	11.2	1	11.2	3	33.2	2	22.2	9	100.0
TUBERCULOSIS	4	8.2	2	4.0	7	14.3	4	8.2	9	18.4	7	14.3	10	20.4	6	12.2	49	100.0
CANCER	1	5.9			3	17.6	4	23.5	1	5.9	6	30.0	2	11.8			17	100.0
RESPIRATORY			2	10.0	2	10.0	2	10.0	3	15.0	6	30.0	3	15.0	2	10.0	20	100.0
ACCIDENTS			3	17.6			2	11.8	4	23.5	5	29.5			3	17.6	17	100.0
GENERAL	2	5.5	6	16.7	5	13.9	1	2.8	3	8.3	8	22.2	5	13.9	6	16.7	36	100.0
CIRCULATORY, NERVOUS & DIGESTIVE	5	6.9	2	2.8	12	16.7	12	16.7	9	12.5	9	12.5	13	18.1	10	13.8	72	100.0
TOTAL	12	5.5	15	6.8	30	13.6	26	11.8	30	13.6	42	19.1	36	16.4	29	13.2	220	100.0

Source: Hamilton, Death Certificates, 1910.

TABLE 30

MORTALITY BY OCCUPATION, HAMILTON, 1910

CAUSE	TRANS-PORT	COMMERCE	PROFES-SIONAL	UN-SKILLED	SKILLED	PUBLIC SERVANT	SEMI-SKILLED	CONST-RUCTION	UNCLAS-SIFIED	TOTAL
TYPHOID		2		1	1			1		5
OTHER CONTAGIOUS				1						1
TUBERCULOSIS	5	7		8	16		2	4		42
CANCER	2	1		4	2		1	2	1	13
GENERAL		1		1				1		3
NERVOUS	1	1	1	6	1		1	2	2	15
RESPIRATORY		3	2	6	4		3	2		20
CIRCULATORY	1	7	1	6	3	3	2	4	3	30
DIGESTIVE	3	3		1	2		1		1	11
CHOLERA INFANTUM							1			1
GENITO-URINARY	2	7		5	4	1		1		20
LOCOMOTIVE	1									1
OLD AGE		1			1		2	2		6
SUICIDE	1							1		2
ACCIDENTS		3		6	1	1	4	3		18
ILL-DEFINED				1						1
TOTAL	16	36	4	46	35	5	17	23	7	189

Source: Hamilton, Death Certificates, 1910.

This group, which made up 19.0 per cent of the total in the group, also had the highest percentage of deaths attributable to genito-urinary disease, 35.0 per cent. Most of the accidental deaths, 55.5 per cent, were among the skilled and semi-skilled workers. This data is inadequate to support any conclusions about the relationship between occupation and cause of death in Hamilton, 1910. More complete information is needed about the length of time spent by the deceased in his occupation and about the general distribution of occupations within the population in 1910.

This analyses of mortality by ward for specific age groups has been useful in highlighting a possible relationship between such factors as population density, overcrowding, and related environmental conditions and the incidence of mortality among the residents of the wards of Hamilton. The best indicator of any possible relationship between socio-economic circumstances and mortality appears to be an analysis of differential mortality from ward to ward based on the cause of death per 10,000 of population, a statistic which has been used to good effect in similar studies.[20] In Hamilton, these total death rates vary from lows of 85.5 and 84.8 in Wards 1 and 2 encompassing as they did the more affluent, and geographically advantageous areas of the city, to highs of 138.3 and 140.9 in Wards 5 and 6 located in the shadow of the city's factories. Mortality rates for specific diseases show a similar variation per 10,000 population from ward to ward. The highest rates for contagious diseases were in Ward 8 at 14.6 per 10,000, the lowest, 3.8, not surprisingly, in Ward 1. Tuberculosis was highest in Ward 5, 15.1 per 10,000 population, and lowest in Wards 4, 5.0, and 1, 5.1. The lowest incidence of cancer, at the present considered to be partially related to environmental factors, was

in Ward 1, the highest in Ward 6. Accidental death was highest in Ward 5; lowest in Ward 1. Similarly, respiratory ailments, a category which included pneumonia, resulted in the highest mortality rates for Wards 4, 5, 6, 7, and 8, and the lowest in Ward 1. In sum, in almost all categories, mortality in Wards 1 and 2 was lower than in the other wards of the city. On the other hand, mortality in Wards 5 and 6 was higher.

These statistics, when considered with the individual parts of the micro-analysis confirm, that just as mortality rates varied between the province of Ontario and its urban areas, between the urban areas and individual cities, such as Hamilton, so there were variations from ward to ward in Hamilton. These differences in mortality, both per 10,000 of population and for specific categories of disease, appear, insofar as this study can determine, to be related in some way to the socio-economic condition of the occupants of the ward. The lowest mortality rates in Hamilton in 1910 were found among that segment of the population least subject to overcrowding and which had the highest per capita property value. Conversely, the highest mortality rates were recorded for those persons living in wards with the highest population density, the lowest property values and where, according to Dr. Roberts, "overcrowding [was] very much in evidence, and the careless tendencies of the population [were] intensified by the lack of sewerage."[21] It is not possible, however, from this micro-analysis, to discover whether any one environmental element was a more important contributing factor to mortality rates than any other or whether individual attributes, such as occupation and ethnicity, were highly correlated with differential mortality.

By 1912, the mortality rate in Hamilton was decreasing. The

mortality rate of 14.0, computed using statistics from the Registrar General's statistics, was lower than at any time in the century and had moved closer to the provincial rate of 12.5 than to the urban rate of 15.8. In 1914, Hamilton's mortality rate was the same as that for the entire province at 12.8 per 1000 population. Only further studies such as this will answer the question of whether as the health of the people of Hamilton improved, such benefits as this might confer were distributed evenly throughout both the population and the city; or, whether good health remained, as it appeared to have been in 1910, a characteristic of those whose standard of living lifted them above the ecological conditions in which the vast majority of Hamilton's population lived at the turn of the century. Identifying and, if possible, ameliorating these conditions was the responsibility of the city's Health Department. Its activities, the attitudes of its directors and their relationship to city officials and to the public are the subjects of the next chapter.

FOOTNOTES

[1] Annual Report of the Hamilton Board of Health, 1912, p. 19. Hereafter cited as ARHBH.

[2] G. Condron and E. Crimmins-Gardner, "Public Health Measures and Mortality in U.S. Cities in the Late Nineteenth Century," Human Ecology 6 (1978), 27-53.

[3] Ibid., 42.

[4] F.B. Smith, The People's Health, 1830-1910 (London, 1979), p. 325.

[5] OSP, 1909, No. 19, p. 8.

[6] Hamilton Herald, October 1, 1909.

[7] Hamilton Spectator, October 4, 1910.

[8] ARHBH, 1913, p. 4.

[9] ARHBH, 1910, p. 4.

[10] Seventy-third Annual Report of the Registrar-General of Births, Deaths and Marriages in England and Wales (1910). London, 1912 as cited in Emma Duke, Infant Mortality: Results of a field study in Johnstown, Pa., United States Children's Bureau, Pub. No. 9 (Washington, D.C., 1915) as cited in R.H. Bremner, (ed.), Children and Youth in America: A Documentary History, Vol. II. 1866-1932 (Cambridge, Mass., 1971), p. 967.

[11] Terry Copp, The Anatomy of Poverty (Toronto, 1974), p. 93.

[12] S. Shapiro, E.R. Schlesinger and R.E. Nesbett, Jr., Infant, Perinatal, Maternal and Childhood Mortality in the United States (Cambridge, Mass., 1968), p. 276.

[13] City of Hamilton, Assessment Roll, 1910.

[14] George Rosen, A History of Public Health (New York, 1958), p. 342.

[15] Bessie L. Pierce, "Society and Labour in An Expanding City," in A.M. Wakstein, The Urbanization of America: An Historical Anthology (Boston, 1970), p. 247.

[16] M. Beaver, "Population, Infant Mortality and Milk," Population Studies, 27 (July 1973), 243-254.

[17] R. Wodehouse, "Vital Statistics Pertaining to Infant Mortality," Public Health Journal, 11 (August, 1911), 363.

[18] Carol Dyhouse, "Working-Class Mothers and Infant Mortality in England, 1895-1914," Journal of Social History, 12 (Winter, 1978), 255.

[19] Smith, The People's Health, p. 288.

[20] See Condron and Crimmins-Gardner.

[21] ARHBH, 1910, p. 21.

CHAPTER IV

DR. JAMES ROBERTS AND PUBLIC HEALTH IN HAMILTON, 1900-1914

On March 27, 1900, the Hamilton Spectator boldly proclaimed to its readers that an examination of statistics drawn from one hundred cities throughout the world confirmed Hamilton, Ontario as the healthiest. With a mortality rate of 12.9 per 1000 population, in 1898, Hamilton compared most favourably to other cities in Ontario. London and Toronto, the paper reported, had mortality rates of 13.8 and 15.2 respectively. Far down the list were Montreal with 22.9 and Quebec City, with 27.2. The list concluded with Pernambuco, Brazil which had a mortality rate of 42.1 per 1,000.[1] Claims of this nature were common in Hamilton during the early years of the twentieth century. Civic pride about the city's health surfaced in the pages of Hamilton's newspapers and publicity pamphlets for the next fifteen years. As the foregoing chapters have demonstrated, if the people's health compared favourably with the health of urban populations elsewhere in the world, Hamilton, in the years 1900 to 1914, was not the "healthy" city its civic leaders assumed it was. Problems related to the health of the people of Hamilton increased as the city mushroomed from a population of about 50,000 in 1900 to 100,000 fifteen years later.

The health of Hamiltonians provoked a variety of responses from civic officials, the public, the press and from concerned citizens. Not least of all, the problems required action on the part of the city's public health authorities. Its Medical Health Officers, in particular,

were charged with the dual and conflicting responsibility of dealing as effectively as possible with the factors contributing to mortality in the city, while defending Hamilton as "among the most healthful cities on the continent."[2]

In particular, this chapter examines the activities of Dr. James Roberts, Hamilton's highly visible M.H.O. from 1905 to 1940. Of necessity, some of the problems facing Roberts' predecessors in the officer from 1900 to 1905 and the general sanitary and health conditions of the city will be discussed. Much of the descriptive material, like the statistical data, is drawn from the Ontario Sessional Papers and, in particular, from the few reports sent by Hamilton's M.H.O.'s to the provincial Board of Health for publication in the annual reports of the Ontario Board of Health. In addition, several more detailed reports were published by the Hamilton Board of Health itself after Dr. Roberts took over in 1905. Newspaper accounts were used extensively because the activities of Roberts were "big news" and were avidly followed by city newspapers. Relying on these sources, it is possible to demonstrate how the health department handled the many problems it encountered, from routine matters such as the inspection of unsanitary premises to a major outbreak of smallpox, typhoid or poliomyelitis. Through all of this James Roberts remained a tireless promoter of his department's independence and of his own authority as the guardian of public health in Hamilton. He was no radical reformer in this so-called "golden age" of public health. He was a realist who appears to have done only what was possible within the context of contemporary public opinion about the relationship between public health and the image of urban progress.

I

The reports submitted by Hamilton's medical health officer from 1900 to 1905 highlight the same health and sanitation problems as those troubling the provincial board. The last report written by Dr. Isaac Ryall, longtime M.H.O. for Hamilton who died in 1900, pointed out the prevalence of contagious disease, and especially of typhoid fever, in the city. The number of cases of typhoid alone had soared from 37 in 1898 to 61 in 1900.[3] Ryall noted that although he personally could not (or would not) confirm a relationship between sickness and the state of Hamilton's water supply, "several complaints had been made of the muddy condition of the city water." Ryall does not appear to have been an adherent of the germ theory. He advised citizens to "make a flannel bag, attach it to the tap and allow the water to filter through it; it will catch all the solids." Such a bag, he added, being easy and cheap to make, would "reach all conditions of the people."[4]

In addition to monitoring the number of deaths and cases of reportable illnesses in Hamilton, the department of health was responsible for scavenging, or refuse removal in the city, and for the sanitary inspection of businesses and homes where necessary. Consequently, Ryall was proud to report that, in 1900, five scavengers employed by his office had collected 9,595 loads of refuse, including all the soiled rags from the hospital, in biweekly pickups with a cart and horse. The department's three sanitary inspectors had conducted 5,320 routine checks throughout the city, delivered 493 notices to clean privy vaults, placarded 173 homes for infectious diseases and fumigated 215 houses.[5]

After the death of Dr. Ryall, Walter Langrell, M.D., was appointed as M.H.O. in March, 1901.[6] Langrell, like Ryall before him, directed his attention to the high mortality rates from typhoid fever and diphtheria. He attributed the high mortality to the failure of physicians to report mild cases of these diseases; but much of Langrell's energy, in contrast to the policy of his more complacent predecessor, was directed, as well, at publicizing the link between the incidence of typhoid fever and the quality of the city's water supply. Langrell adopted the slogan "Show me a city's statistics of typhoid fever, and I will tell you the character of its water supply".[7] Hamilton's typhoid rate for 1901, 19 per 100,000 of population, although nowhere near the 142 of St. Petersburg, was higher, according to Langrell, than Berlin (5), Vienna (5), Paris (11), London (14), or New York City (16) and had been considerably higher, in 1900, at 30 per 100,000. Moreover, argued Langrell, Hamilton, with its excellent geographical location and its water supply "at such a long distance from any point of contamination by sewage", should have had a much lower mortality rate from typhoid. Langrell was nevertheless forced to concede that in his opinion the city's water system, "either in the source of supply or the mode of filtration and storage"[8] was the source of the contamination. Hamilton's water was drawn from Lake Ontario and filtered, since 1894, through sand in basins. At least one newspaper, the Spectator, which was a continual critic of the filtration, supported Langrell's attacks on the water system.

Mortality from diphtheria elicited an equally provocative response from Langrell. Again, he cited underreporting of all cases of diphtheria as contributing to the ostensibly high mortality rate in Hamilton. As proof, Langrell recounted a pitiful tale drawn from his own experience.

The story is worth quoting since it was later retold by provincial public health officials.

> Just recently a child died from what the attending physician called laryngitis. When the death report came into my hands to be examined I thought it looked suspicious, and summoned the physician for an interview. He claimed that the disease was not diphtheria, but admitted that two children in the same family had just previously had "a sore throat with some traces of membranes, which disappeared in a couple of days." In the meantime a public funeral had been held, small boys acting as pall-bearers. The sequel was that five neighbouring children were infected with diphtheria from these cases, all in a severe form.[9]

Langrell's solution to diphtheria mortality was to establish a city laboratory which could examine throat swabs to confirm suspected cases, but several years of heated controversy were to pass before this proposal was adopted by the city.

Another of Langrell's suggestions to improve health in the city was more readily accepted. In 1901, one of every eight deaths in the city was the result of tuberculosis. As noted in the previous chapter, tuberculosis was the leading cause of death among young adults throughout the period. Langrell realized the gravity of the situation in Hamilton and was among the first in the city to endorse the construction of a sanatorium in the area, suggesting the mountain as a possible site. The idea was acted upon three years later by the Hamilton Health Association, a voluntary philanthropic organization formed to combat tuberculosis.[10] Langrell also argued that tuberculosis should be a notifiable disease; all cases of the disease, not just deaths, should be reported to the M.H.O.[11] This suggestion was adopted by the Hamilton Board of Health and the city council a year later. On November 24, 1902, the city council passed By-law 226 which first required a physician to report to the M.H.O.

all cases of diphtheria, smallpox, scarlet fever, cholera, measles or other diseases "dangerous to the public health which he is called upon to visit in the city of Hamilton ... within twenty-four hours" and to report either the patient's death or recovery within twenty-four hours. The by-law went further, moreover, requiring as it did that "every medical practitioner practising within this municipality shall report to the M.H.O. upon one of the forms provided by him for the purpose every case of pulmonary tuberculosis which he attends or is called upon to visit in the City of Hamilton." Such reports were to be made "within one week after he knows that his patient has such disease." If the patient died from such disease the death was to be reported to the M.H.O. within twenty-four hours.[12] Because only mortality, not morbidity, statistics were ever published for tuberculosis, it is impossible to evaluate the significance of this part of the by-law. Nor is it possible to determine just what role such legislation might have played in the decrease in tuberculosis mortality in the city.

Langrell seems to have been in the vanguard of those few in Ontario who publicly recognized the extent of infant mortality. He presumed to know the causes of infant mortality in Hamilton: "premature births, heredity, intemperance, neglect, illegitimacy, insanitary surroundings and improper food." Moreover, he added, "industrial conditions figure largely in the neglect of infants, since mothers in employment return as soon as possible after their confinement to their work, and entrust their offspring to the care of older children and others, by whom they are improperly fed and looked after."[13] Yet, in the long run, Langrell did not pursue the problem of infant mortality, preferring to work "to lessen the ravages of tuberculosis."[14]

Still, another problem facing both health officials and the public

in Hamilton was smallpox, despite the fact that no deaths were reported from this cause in Hamilton during the period under study. The very word smallpox seems to have been an anathema to the people of Hamilton who were only too aware of the mortality and horror associated with the disease in the past. Two cases of smallpox in May, 1901, illustrate this fear. The Spectator reported on May 27 that smallpox had been present in the city for some time, but that the disease had been confused with its less serious look-alike, chicken pox. A case at 108 Inchberry Street, in Ward 4 in the western end of the city, had not been quarantined and the disease had spread to a neighbouring house. As a result the entire street was placed under the restrictions of quarantine enforced by police. P.H. Bryce, secretary of the provincial Board of Health, was summoned to the city to investigate. He confirmed that the cases were, without question, smallpox and he advised that an isolation tent should be erected to house the victims. "Pest tents" were subsequently raised in the cemetery near the Desjardins Canal on the western edge of the city. The citizens of Ward 4 within whose boundaries the tents were located, indignant that such an offensive and dangerous hospital should have been put up adjacent to their homes, immediately organized a protest movement. When the voices of a group of women proved to be an ineffectual weapon to force city council and the mayor to move the tents, the men of the ward resorted to more violent methods. After dark, several men poured oil on one of the as yet unoccupied tents and ignited it. The fiery protest was to no avail. The tent, the Spectator noted, was rebuilt at a cost to the taxpayers of $10.00. In an editorial on the same day, however, the Spectator supported what it felt were the legitimate fears of the people living in Ward 4. Self-preservation,

the editorial explained, was the first law of nature. "Which of you would not object to a pest tent at your door?" Politics, rather than public welfare, appears to have been the determining factor in the placing of the pest tent. According to the Spectator, "The men who live in the neighbourhood are hardworking people: good, sober, industrious men. Their greatest fault seems to be that they have few votes among them."[15] They were poor and therefore not expected to object to what was a potential threat to their welfare.

The epidemic did not subside rapidly. By May 30, nine patients were in tents and a telephone had been installed for the doctors' use.[16] In compliance with Dr. Bryce's orders, and, in accordance with the Public Health Act of 1884, a widespread vaccination campaign began. On one day alone, May 30, three hundred persons were vaccinated. So many school children had sore arms that drill competitions were cancelled. No children were admitted to school without vaccination certificates.[17] By June 14, Dr. Langrell was pleased to report that there were no new cases, contradicting his critics who claimed that he was guilty of suppressing facts about the epidemic.[18] The epidemic, mild though it might have been by past standards, provided Langrell with more than enough evidence to support his arguments for "a proper permanent isolation hospital."[19] He received neither moral nor financial support from the city council and pleas for such a hospital were repeated by the M.H.O. for many years. The Spectator, for one, opposed the project because of the lesson it drew from the smallpox epidemic. Patients in the tents had been so comfortable, the paper reported, that they were reluctant to return to their homes. "It was a picnic for all concerned."[20] A few weeks later, the Spectator applauded as "inspired"

the plan to relocate the tents on Waddell Road near the Desjardins Canal, an out of the way location which would offend nobody.[21] The tents did not provoke further medical controversy; but three years later, the Spectator noted that tramps had been sleeping in the tents and that the furnishings had all disappeared. The thieves were in no danger of contagion, however, because the tents had not been used for medical purposes in over a year.[22]

Dr. Langrell's report for 1903 expressed great optimism over a lower mortality rate. No matter which statistics are used, there was a decrease of .8 per 1000 population in the death rates from 1901 to 1902. Langrell attributed this improvement to generally "good sanitary conditions,"[23] although he continued to blame inadequate sanitation and improper diet for a still unacceptable rate of infant mortality. As well, the city's water supply seems to have been a continuing source of public concern. The Spectator insisted that the city's water was very bad, "filtered" through sand littered with dead fish. It was then exposed in shallow basins that reputedly had not been cleaned for two years. Finally, the contents of what the paper derisively labelled "the Barton frogpond" were emptied into the mains.[24] The same summer, offensive, even nauseating, odors were reported, possibly originating with the Freeman fertilizer works, in the vicinity of Barton and Wentworth Streets in Ward 7 in the northern industrial area of the city. One physician, Dr. Griffen, suggested a link between the "dead horse odor" and the many cases of vomiting in the area. Forty citizens of the area appeared at the city hall to complain, but no action was taken by the city or by the M.H.O. against the nuisance.[25]

Another aspect of sanitation that was brought to the attention of

the public during these years was impure milk. Newspapers, public health officers and physicians began to inform the public about the possible dangers from the consumption of insanitary milk. The Spectator criticized milk inspection throughout the province, labelling it a "farce", because, it argued, inspectors often granted certificates to filthy premises.[26] Langrell himself had apparently traced the source of a recent typhoid outbreak, which had been blamed initially on water, to milk from an unclean farm. He had revoked the dealer's license. By 1903, the inspection of local dairies and the analysis of milk samples had become an integral part of the duties of the medical health office. Milk samples, however, were not tested for bacterial count, only for butter fat content and for the presence of illegal additives, such as annetto, a colorant, and formaldehyde, a preservative. In the summer of 1903, twenty-five per cent of the 109 milk samples tested contained formaldehyde. Seven dealers were prosecuted and fined. According to Langrell, "the represensible adulteration ceased,"[27] although the threat to public health from this source persisted. About this same time, reports of overcrowding and a housing shortage began to appear in the newspapers. In 1904, after their annual visitation, the assessors noted, in particular, the congestion prevalent in the east end. At the corner of Sherman and Barton Streets one house lodged forty boarders, while nine Swedes (the papers were always quick to point out the racial origin in such instances) were housed in a 10' x 10' shed.[28] As soon as houses were completed, tenants moved in. There were no vacant homes.[29] These accounts merely hint at the housing crisis that had afflicted Hamilton, as it had other growing industrial centres in Ontario and North America. At the same time, certain sections of the city were

pinpointed by the M.H.O. as areas where specific illness, in particular, contagious diseases, were most prevalent. In his earlier reports to the provincial Board of Health, Langrell had emphasized the equal distribution of disease throughout the city. In June 1904, he acknowledged that the Victoria Avenue School area, located in Ward 7, was "fated in matters of contagious disease." Four deaths from diphtheria alone had occurred in the area, the worst section of which ran from King Street north to Barton and east from Victoria to Wentworth Streets. On June 16, the school was closed following yet another death. But Langrell did not know whether to blame the school with its admittedly dirty plumbing, or overcrowding and carelessness at home, for the rapid transmission of the disease.[30]

At the end of the year, when the mortality statistics were tallied, Langrell attributed the increase from 15.3 deaths per 1000 population in 1903 to 17.3 in 1904 (statistics from O.S.P.) to an increase in the elderly in the city and to the cold weather.[31] A rise in the mortality from tuberculosis from 73.9 per 1000 deaths in 1903 to 108.3 per 1000 deaths in 1904 passed without comment, perhaps because these figures run counter to Langrell's claims of the previous years that "better understanding and treatment of tuberculosis and ... the better education of the people in its causes and prevention" were responsible for its decline,[32] or perhaps because Langrell, unlike his contemporaries, did not accept the social connotations attached to the disease.

In a lengthy article, "The Health of the People," which appeared in the Hamilton Spectator Carnival souvenir edition of 1903, Langrell had an opportunity to present his views about the health of the city to the public. Langrell argued that good health depended upon a beneficial

environment and that climate, the most significant environmental factor, acted to eliminate or reduce certain diseases. Hamilton death records did not show, he contended, any climatic causes for diseases and therefore, it seemed to follow, environmental factors in the city did not contribute to mortality.[33] The air was pure, the water good. In fact, Hamilton was "... the only city on the Great Lakes which [was] trying to do its duty to preserve the purity of these waters." Just how this was being done, Langrell neglected to explain. Every safeguard was being taken, he maintained, for the "preservation of health". As a result, Hamilton's average death rate of 14 per 1000 over the past five years was "unequalled on the continent."

The article singled out for special praise the city's low mortality from typhoid and from cholera infantum. Hamilton's record of infant mortality was the result of good quality, clean milk which was "very important to the health of our infant population as the great cause of infant mortality in cities is from derangement of the digestive tract due to impure milk." Electricity, too, had played a role in the overall health of the city because, Langrell argued, electricity in factories, had contributed to a much cleaner workplace. Nor was Hamilton "cursed with tenements, with their overcrowding and vice, as ours is a city of homes."[34]

Of equal importance in creating a healthy city was its citizenry. Lapsing into what sounds like the rhetoric of the eugenists, but may merely have been a reflection of commonly held anti-immigrationist attitudes, Langrell informed readers

> That we are healthy people is in no small degree due to the fact that we are comparatively free from degenerate races, which form such a prominent feature in many American cities and that we

> come from good old British and Teutonic stock. Heredity and blood increase in importance as the years race by and it is a pleasure to know that the stock from which our population is formed has such an honourable history.... A healthful moral and cultured city are ensured happiness.
>
> There are no tenements in Hamilton - no disease breeding centers. Ground room is plentiful, fresh air is to be had for the breathing, and if people get sick it is because they like to see their friends, the doctors, coming around once in a while.[34]

The article, in a publication obviously intended to present the city in the best possible light, probably cannot be taken as Langrell's true appraisal of conditions in the city. His own reports to the provincial Board of Health, which were not meant for public scrutiny, present a much grimmer picture. The article is typical of the simplistic and chauvinistic "boosterism" which often characterized the city's attempts to attract industry and population. Quite likely, most people living in Hamilton could refute Langrell's public rhetoric from their own or their neighbours' experiences.

Another smallpox outbreak early in 1905 underlined the gulf between appearance and reality and, incidentally, the incipient tension between the most recent wave of immigrants and the English-speaking workers in the city. An employee at International Harvester who lived in a boarding house on Pearl Street in the west end of the city (Ward 4) and who had never been vaccinated was the first victim. A second employee, at 182 Hughson Street, contracted smallpox only days later.[37] The Spectator reported that even though it was quite likely that further cases would be diagnosed, many employees at International Harvester refused to be vaccinated. This resistance, allegedly on the part of recent immigrants, added to the already obvious discontent among English-speaking workers over the increasingly

large numbers of foreigners being hired by the company. The paper bluntly revealed that English-speaking employees had said "that if some of these foreigners had smallpox it would be impossible for a physician to know it owing to the amount of dirt on their bodies."[38] Although no deaths occurred, in all, ten cases of smallpox were reported before the outbreak abated.[39]

In June, 1905, Dr. Langrell resigned as M.H.O. to take up the position of medical superintendent of the city hospital. He had first informed the Board of Health of his intentions in December of 1903.[40] There do not appear to have been any conflicts in matters of public policy between Langrell and the Board or the City Council that would have forced him to seek alternate employment. Finances, and perhaps professional preference, were involved in Langrell's decision to resign as M.H.O., a position which, in Hamilton, precluded a private practice. Langrell's salary of $2500.00 per annum as hospital superintendent represented a substantial increase over the $1800.00 he had received as M.H.O.[41] The Spectator, which had supported Langrell more often than not, endorsed an increase in his salary. "The city," it argued, could not "afford any cheeseparing where the health of the community [was] at stake. A sickly city cannot flourish. Let Hamilton keep the services of a man who has proved his ability... and pay him a fair salary."[42] The plea went unheeded.

The salary was payment for all the work done by the M.H.O. and Chief Physician and was defined in the following by-law:

> (1) the M.H.O. shall devote his whole time to the duties of his office, and shall not engage in private practice, but shall be entitled to receive, in addition to his salary, the fees which may be paid to him as compiler of statistics or as accoucheur at the City Hospital.

(2) His office hours at the City Hall shall be from 9 a.m. to 12 noon and from 2 to 5 p.m.

(3) As City Physician he shall prescribe for and attend the sick poor on the order of the Mayor.

(4) He shall act as physician to the House of Refuge, visiting the house twice at least every week, and whenever called for, and shall attend all sick inmates and prescribe and compound the necessary medicines.

(5) He shall be examining Medical Officer of the Police Force and of the Fire Department, and examine all candidates for appointment to the force or department, and examine constables reported sick, and present his written report to the Chief of Police.

(6) He shall attend all policemen and firemen who may be injured in the discharge of their duty.

(7) He shall vaccinate poor persons on the order of the Mayor or of the Chairman of the Board of Health.

(8) He shall attend all meetings of the Board of Health and shall make a report in writing to the Board at each monthly meeting upon the matters pertaining to his duties as M.H.O.

(9) He shall have entire charge and control of the Health Office and of the Sanitary Inspectors under and subject to the Board of Health.

(10) He shall see that the inspectors report daily the inspections made by them and that a proper record is kept in a book in the Health Office of all such inspections.

(11) He shall perform the duties of surgeon to the City Jail and shall be entitled to receive in addition to his salary, the fees paid for the examination of prisoners to be removed to the Central Prison or Female Reformatory.

(12) He shall be under the direction of the Board of Health in the discharge of his duties as M.H.O., subject to the control of the Council and in all other matters shall be under the control of the Council.[43]

The salary of the M.H.O. was paid jointly by the various departments to whom he was responsible. For example, in 1901, a year for which a specific breakdown is available, $600.00 of the salary of $1000.00 was paid by the

Board of Health, $150.00 by the House of Refuge, $150.00 by the Jail and another $100.00 by the Police Department.[44]

The City Council formally accepted Langrell's resignation at a meeting on July 7, 1905, and, at the same time, announced the appointment of Dr. James Roberts, M.D., as Medical Health Officer, City Physician, and Accoucheur, City Hospital, at a salary of $1,600.00, a sum his "friends" had been certain he would refuse.[45] Roberts' acceptance set him on a course of public health reform which embraced, to a greater or lesser extent, most of the problems characteristic of Hamilton's changing ecology for the next thirty-five years.

II

James Roberts was born in 1877 at Woodhouse, Ontario. In 1900, he graduated from McGill University with a degree in medicine and had practised in the Muskoka district before moving to Hamilton to work as an assistant to a senior physician. In 1905, at the age of 28, he accepted the position of M.H.O. for Hamilton, an office which he held until his death in 1940. When he died, Roberts was recognized as the senior M.H.O. on the continent in terms of service.[46] Roberts was, it seems, an abrasive personality. Even in his early years, he clashed with his superiors and colleagues alike over a variety of issues. At his death, his independence, feistiness and confidence in his own "considered opinions" were remembered. Roberts had never been "one of the herd." In spite of his personal characteristics which frequently brought Roberts into head on conflicts with those in authority, his attempts to improve the health and the social condition of the people of Hamilton were, according to those who knew him,

sincere and courageous. Former Mayor Thomas Jutten, for one, vowed that he "had never met a man who had the public interest more at heart."[47]

Roberts does not conform to Barbara Rosencrantz's conception of physicians within the public health movement as men "often distinguished from their peers by professional and social connections which assured their special status in the community."[48] She contends that physicians involved in the field of public health, with few exceptions, possessed independent wealth which allowed them the luxury of a comfortable home, and travel and further education in Europe. Roberts' constant badgering for increments in his salary refutes any possible suggestion that he was a man of independent means. He was, however, in the years 1905-1914, at least, one of a very few in Hamilton who, with some understanding and sympathy, identified and directed attention to the social problems associated with urban growth. After his death, at the dedication of a medical building in his memory, Roberts' widow affirmed that "the development and application of progressive public health measures was the doctor's whole life."[49]

Hamilton, in 1905, offered substantial scope for the spirited and ambitious young M.H.O. to apply these "progressive public health measures." In particular, the city was already experiencing the serious overcrowding as a result of the population growth that was to swell its numbers from 57,568 in 1905 to 101,190 in 1914. Every new home was either sold or rented as soon as it was ready for occupancy. Small houses were divided to accommodate two or three families; even the well-to-do rented out rooms in "their large well situated" homes to "desirable parties."[50] As might be expected from an M.H.O. with only six months' experience, however, Roberts' first report to the provincial Board of Health in 1905 lacked

specificity. Indeed, he boasted that "the sanitary condition of Hamilton had never been better ..., all nuisances complained of having received prompt attention and the necessary steps having been taken to remove the cause."[51] By 1912, however, Roberts was less optimistic. He continued to support Langrell's notion that "Nature [had] indeed smiled upon our city", and he referred to the sense of pride he had felt in contributing to the city's promotional literature six years earlier. But he was forced to admit that the principal source of Hamilton's public health problems was, in 1912, as it appears to have been when he became M.H.O., overcrowding and poverty.[52] Newspaper accounts and mortality statistics corroborate Roberts' contention that between 1908 and 1913 the city had undergone a transformation, at least in part, as a result of "the inflowing army of persons seeking employment, consisting largely of those with little or no capital and very few temporal possessions."[53] By 1912, Roberts had come to recognize social and economic changes as threats to the health of the city, agreeing with an unidentified social critic that "nothing can so effectively destroy a city's future as the disproportionate increase of homes that are insanitary, damp, dark, unventilated, unclean, unattractive and immoral."[54]

But, in 1906, Roberts' evaluation of the Hamilton's health was, as noted, much like that of his predecessor. His contribution to the Hamilton, Canada, Visitors' Handbook, published by the Assessment Department in 1906 to encourage manufacturers to locate in the city, is a good example of Roberts' early appraisal of the city. While it is unlikely that any unfavourable remarks about the city would have been tolerated in such a volume, Roberts affirmed in 1912, that his article had been a fair

representation of the "then existing conditions."[55] The article, "Healthy Hamilton," drew attention to the condition of the city's factories and homes, a topic of interest to both potential industrialists and their employees. Roberts pointed out that in Hamilton manufacturing plants were models of "the practical application of modern sanitary methods," well-ventilated and roomy. Factories were as free of dust and other contaminants as possible and were equipped with the latest conveniences, (an obvious reference to indoor toilets), "which contribute so largely to the contentment and comfort, the happiness and well-being of the average wage earning citizen."[56] The homes of the "industrial classes", located near to the workplaces, were "in the main substantial and comfortable and from year to year assuming improvements from all points of view."[57] In most cases, the grounds attached had been, in Roberts' opinion, "carefully and tastefully beautified in a manner which speaks much for the mental and moral atmosphere within."[58] The water and the milk supplies in the city were, Roberts argued, very clean. This was confirmed by the low typhoid incidence in the past year. To make life even more agreeable for the people of Hamilton, the Health Department was quick to enforce its laws and regulations. In sum, Roberts observed, the people of Hamilton "for the most part, of English, Scotch and Irish Descent are healthy and hearty, ... mentally and physically up-to-date and progressive, ... law-abiding, sociable and affable and embued with the idea of keeping Hamilton in the forefront of Canadian cities."[59] In reality, (as Roberts quickly discovered) far fewer Hamiltonians than he believed achieved this sort of prosperity and health in "the city of homes". The public outcry over the condition of Coal Oil Inlet, an

issue which seems to have first surfaced in the summer of 1906 is a case in point.

Coal Oil Inlet, located in the northeast section of the city, became a public issue after officials from the provincial Board of Health had to be commandeered to investigate the source of the effluents flowing into it.[60] The investigation committee, Charles Sheard and C.A. Hodgetts, concurred with the city engineer, who had recommended that the Inlet be filled in. The assorted nuisances in the area, accumulated scrapings from cattle cars of the Grand Trunk Railway property, five vats of decomposing swill, solid manure and "liquid filth" at the Stroud livestock pens and foul gases at the Freeman fertilizer works, were to be removed or abated.[61] Untreated sewage was reported to be flowing into the inlet at the site of the disposal works. Consequently, the sewage works and the storm sewer which allegedly overflowed into the Inlet were also labelled as nuisances to be remedied.[62] The owners were ordered to clean up their properties, but the matter remained unsettled, absorbing much of Roberts' time and energy. His stand against the owners of the industries involved, who held the water in the inlet itself accountable for the stench, gained Roberts the unanimous support of the Board of Health. The city fathers, however, dragged their feet over the issue,[63] even in the face of Sheard and Hodgetts' considered opinions that conditions around the Inlet constituted "a very serious nuisance to a large number of citizens resident within a considerable area adjacent to the Inlet."[64] The Board of Health and Roberts appear to have been partially vindicated when Stroud was later charged with a breach of the Public Health Act by feeding his hogs, "without boiling, the blood and offal of slaughtered animals."[65]

During the same time that he was forced to cope with the Coal Oil Inlet controversy, Roberts confronted a serious outbreak of typhoid. Eleven of the ninety-nine persons who contracted the disease in September and October of 1906 died.[66] From the outset, Roberts had suspected the water supply and publicly stated that he had very little confidence in the efficiency of the existing settling basins. All water and milk, he warned Hamiltonians, must be boiled to eliminate contamination.[67] The warnings were repeated but, in return for his concern, Roberts was threatened, although how or by whom is not clear. Members of the city council tried in vain to persuade him to withdraw his allegations against the public water supply. Roberts staunchly refused to be so "intimidated", replying in a crusading tone that "the health of the people was of more consideration to him than the prejudice of those who could see nothing wrong with the settling basin water."[68] Finally, on October 9, Roberts informed the public that because typhoid could be contracted solely by mouth, all vegetables should be thoroughly cooked and hands washed scrupulously in households where there was a patient suffering from typhoid. Moreover, all typhoid contracted after the warning would be "due to neglect and failure to carry out minutely the directions given here."[69] The epidemic was sufficiently serious to attract the attention of the provincial Board of Health, which sent Dr. Amyot of the Provincial Laboratory to Hamilton to take water samples. The source of the outbreak was never officially revealed. Colon bacilli, which Dr. Roberts insisted were identical with the typhoid germ, were present in the water samples.[70] In his annual report, Roberts blamed contaminated water and openly criticized British doctors and sanitarians who had begun to indict milk supplies rather than

water as the source of typhoid fever.[71] The epidemic, according to Roberts, was an indication of the desperate need for a laboratory where bacteriological examination of the water supply could be carried on to check the efficiency of the filtration system.

No immediate benefits in the form of a laboratory accrued from the typhoid epidemic, but the episode, following as it had on the heels of the Coal Oil Inlet controversy, established Roberts' reputation as a crusader for improved public health, a reputation which was enhanced only a few weeks later when he took on the hospital board. The hospital, Roberts argued, was to blame for several cases of cross infection and, in particular, Roberts' predecessor, Dr. Langrell, was guilty of neglect. The Spectator printed a verbatim account of a portion of the confrontation between Dr. Roberts and the hospital board, noting that "the doughty medical health officer had all his war paint on."[72] Langrell and Roberts subsequently became embroiled in a debate over the necessity of reporting all cases of contagious disease treated at the isolation hospital. Roberts could not understand Langrell's opposition to such a procedure, whereupon a Mr. Billings, a member of the hospital board, accused Roberts of lacking understanding in many areas. Roberts replied that he did understand his "duty to the public and will do it in spite of your august body, the hospital board." After studying recovery rates from contagious disease at the hospital (which, for diphtheria at 8.5 per cent mortality, were "Better than Boston", 12 per cent), the board voted confidence in Langrell and dismissed Roberts' charges as unsubstantiated.[73] Two weeks later, the Board of Health granted Roberts temporary control over the discharge of patients from the isolation wing, perhaps a belated admission

that there had been some substance to his allegations. Roberts remained dissatisfied with the existing arrangements, however, and continued to campaign for a new isolation hospital like that recently constructed in Ottawa.[74]

Roberts' renewed efforts on behalf of an isolation hospital separate from the city hospital were based on a variety of concerns. The patient's treatment and recovery were of primary consideration, but for Roberts, the social and even economic consequences of contagious illness for the patient's family were equally pressing. For example, only 55 of the 147 cases of scarlet fever which had occurred in a six month period of 1905 and 1906 had been accommodated in the isolation wing of the hospital. The families of the remaining 92 victims had, Roberts speculated,

> in a certain sense sustained the loss of their liberty for a period of six weeks owing to this cause alone, disregarding entirely the homes in addition quarantined on account of diphtheria. The bread winners in all of these instances with other members of the family, who contribute to the weekly income, were compelled to submit to the inconvenience, the hardships and the monetary losses of seeking homes or boarding houses elsewhere. Let me tell you that the weekly incomes of the bread winners, even when augmented by additions from an older boy or girl, are not sufficient in a large percentage of cases to stand any avoidable strain, especially in these strenuous times, when working folk pay high rents for houses in poor repair, and have to depend on heavy coal bills to keep them tolerably habitable.[75]

This sympathetic commentary on the social and economic problems contagious illnesses posed for the working classes who lacked large homes where the patient could be effectively isolated marks Dr. Roberts as one of the very few people in Hamilton who recognized the hazards of day to day living for the vast majority of the people in the city. As M.H.O., Roberts was in a position to identify ill health as one of many calamities which could threaten a family's survival. He recognized, too, that all

members of the household had to co-operate in order to withstand such pressures. His conviction that "no right thinking man or woman, in this enlightened day would place the saving of human life in the balance against dollars and cents"[76] was, however, lost on the city fathers, and his pleas for the isolation hospital went unheeded.

Dr. Roberts' workload became even heavier in March, 1907 when he was appointed by the Board of Education as medical examiner for Hamilton schools. By establishing a form of school medical inspection, Hamilton was following the example of Montreal and many American cities. School medical inspection had been given official sanction in Ontario earlier in the year when the legislature passed a law enabling school boards to make provision for medical inspection.[77] Roberts was required by the Board of Education to make monthly examinations of each class and to report his findings to the class teacher who, in turn, was to inform the parents of their childrens' deficiencies. For his services, Roberts was to be paid $250.00.[78]

The results of Roberts' first inspection of two unnamed schools were published. In the fifteen crowded classes he visited Roberts discovered 300 children with some kind of health problem, perhaps half of the 650 to 700 children he must have examined. In all, 1,400 children from eleven schools had some medical defect. Bad teeth were the most common problem. This prompted the doctor to recommend a dental clinic for the children. Vision and hearing problems were frequent. The condition of many children was simply described as "delicate."[79]

These revelations did not please trustees of the Board of Education who had opposed Roberts' appointment. Trustees Bell and Armstrong pointed

out that it would be difficult for Roberts to visit each classroom every month, that the job was useless because Roberts had no authority to see that his recommendations were followed up and, finally, that the cost was too great. If these kinds of services were extended, the trustees argued, the Board of Education would next be asked to feed the children, an obvious reference to the School Meal programs initiated, in 1906, by the Liberal Government in Britain. Trustee Bell maintained that "the working man or mechanic of to-day was well able to look after the health of his own children and would probably resent the interference of the board or the health officer." Nor was the Board of Health unanimously pleased with Roberts' appointment despite Roberts' own defense that since the Board of Education had asked him to act on its behalf, it was his duty to do so.[80]

The inspection by Roberts was discontinued temporarily. It was later reinstated, and by 1911, 3 nurses were employed by the city in its school health program. Roberts blamed "the hostility and personal malice of the then Mayor toward the Medical Officer of Health and the jealousy of certain civic officials that he was receiving the munificent sum of $250.00 per year extra for performing the duties of School Medical Officer."[81] There may have been some truth in this allegation. A $200 raise in his base salary, additional stipends for dairy inspection, and his dismissal from the post of Accoucheur at the hospital (with loss of fees), all occasioned considerable political in-fighting over Roberts' perquisites.[82]

No health reports were issued by the Board of Health for the years 1908 or 1909. Nor did Roberts submit anything other than statistics for contagious disease for publication by the provincial Board of Health

for this period. Because of this gap in Roberts' own commentary, it has been necessary to rely on newspaper coverage of the problems facing Roberts in 1908 and 1909 in the rapidly expanding city. The Hamilton Herald, for one, carried many revealing reports of the social problems associated with this period of Hamilton's growth. For example, in January, 1908, many "foreigners" in the city were reputedly starving because of the high unemployment throughout the city.[83] Some, apparently Hungarians, refused to accept the help offered by the city's relief officer because they considered such charity dishonourable. One northend company advertised for six workers, but three hundred men, accompanied by their families who claimed to be starving, turned up to apply.[84]

This problem was, apparently, not new. A double suicide in October 1905 was attributed by the Spectator to unemployment and the ensuing poverty. The sixty-three year old man, recently unemployed, had "but little chance of earning his daily bread." He and his wife arranged their clothes for a "respectable burial" and then drank carbolic acid (the most common means of suicide). The suicide was even more pathetic because, as the paper put it, the grammar and writing of the suicide note indicated that the couple were "educated and above the ordinary class of foreigners."[85]

Because of the overcrowding, the threat of a smallpox epidemic in 1908 was even more serious than in the past. Fifty-six cases and one death, which mysteriously never found its way to the Registrar General reports, were reported in the first four months of 1908.[86] By Roberts' own admission, many cases reported as chicken pox, were later identified as smallpox.[87] Roberts recommended that the Board of Health request an

order from city council making vaccination compulsory for those who had not been vaccinated within the past seven years (the period after which earlier vaccinations were rendered ineffective) and that the Board refuse school admission to children who could not produce such a certificate of vaccination. "Special constables" guarded smallpox patients, in spite of protests by several members of the Board of Health over the expense. But, in this instance fear of the disease won out over the expense it entailed.[88] Roberts' suggestions about vaccination, however, met with considerable resistance. The Herald, which in an earlier editorial had sharply critized the Anti-Vaccination League of Canada,[89] now argued that city council should ignore Roberts' requests. It denied the existence of a smallpox epidemic and emphasized that there was no danger of one occurring. Although the Herald did not accept the prevalent notion that vaccination in itself was a source of tuberculosis and cancer, the paper insisted that people should not be forced to be vaccinated against their will. "Hundreds in Hamilton," the editorial concluded, would rather "go to jail".[90] As it happened, the finance committee rejected the vaccination order ostensibly on the grounds that so far there had been no deaths (from less than 20 cases) and if 50,000 persons were vaccinated surely some deaths would result.[91] Over forty more people contracted the disease before the epidemic subsided.[92] On February 29, the Herald noted that smallpox had been wiped out in the city without the use of "drastic measures". Civic officials had kept their heads and followed a course of vigilence. Ironically, the paper praised Dr. Roberts who "proved himself to be the right man in the right place." It was "chiefly

owing to the excellent work of the medical health officer that the city has been saved from a real epidemic."[93]. There are, however, no statements documenting Roberts' own opinion of the efficacy of the measures adopted.

After three years of familiarizing himself with the nature and extent of Hamilton's health problems, Roberts began to be a much more visible and consistent crusader for improved public health facilities and regulations. Again and again, he requested that the city construct a proper isolation hospital to replace the fever ward at the city hospital which could accommodate only sixteen. Isolation in homes, he argued, was ineffective, a hardship to the people and, in the long run, a great expense to the city "which would be compelled to maintain some of the isolated families who are in poor circumstances."[94] The isolation hospital should be built on the same site as the smallpox hospital and not, as many doctors thinking of their own convenience had advocated, at the city hospital. The debate involved more than finances and a choice of location. It called into question as well just who was to be treated at such a hospital. At a meeting of the Board of Health, Roberts quoted "one doctor who is a leader in the agitation to spend more money on the fever building" who stated that "he would not send a child to it, saying 'what does it matter, it's only children from the north end who go there' ". The statement was supported by Alderman Quinn. He agreed that it was the children of the poor (who obviously lacked the large homes necessary for the isolation of a sick child) who were sent to such a hospital.[95] The matter was resolved to the satisfaction of neither faction when, in November, the city council called for tenders to enlarge the existing scarlet fever and diphtheria wards at the city hospital in order to

accommodate more cases.[96] Dr. Roberts, it seems, was not in the city at the time, having requested and been granted a leave of absence from September 15, 1909 to January 15, 1910.[97]

On his return from what may have been a leave to improve his qualifications, Roberts launched a campaign to reduce infant mortality in the city. Up to this point, Roberts, at least publicly, had not acknowledged that this problem existed in the city. He based his concern on 95 children under the age of 5, (82 of them under 2), who had died in the previous year from digestive ailments.[98] Yet, the situation was more critical than Roberts' statistics imply. Infant mortality in Hamilton for 1908, 158.3 per 1000 live births, excluding stillbirths, and 191.5 stillbirths included, was higher than at any time since the turn of the century. This high rate of mortality and reports of a suspected decline in Hamilton's own birth-rate which had provoked suggestions of "race suicide"[99] combined to produce an atmosphere conducive to Roberts' requests to establish, at the very least, milk depots similar to those already operating successfully in many British and American cities.[100] High infant mortality was, Roberts argued, "the outstanding social feature incident to the urbanization of a constantly increasing proportion of our population." It was, moreover, an indication of "how insidiously, even in a young country like ours, old country conditions develop and manifest themselves under which infant life struggles to maintain itself or is ruthlessly crushed out." He agreed with the British sanitarian Sir John Simon who asserted that

> a high infant mortality rate denotes a prevalence of those causes and conditions, which in the long run determine a degeneration of race, and further is an indication of the existence of evil conditions in the homes of the people which are, after all, the vitals of the nation.[101]

Roberts concluded that the problem would not, and indeed, could not, be solved until more time and effort were spent on the education of young men and women in the duties of maternity and paternity. Public morality must be held partly accountable for high rates of infant mortality.[102] In the meantime, Roberts was satisfied to organize clean milk depots.

Dr. Roberts, Mr. William Farrar of the Board of Health and Dr. Parry of the newly established Milk Committee of the Hamilton Medical Society travelled to Rochester, New York, to study the system of milk distribution which had been set up there several years before by Dr. Goler.[103] In Hamilton, as in other Ontario cities, the milk supply was regulated only by rules concerning the amount of butter fat and by some supervision and inspection of stables to prevent the sale of milk produced under unsanitary conditions. "Sterlization, that degree of cleanliness which is the only effective degree, was unknown in the premises of milk producers."[104]

The Board of Health was careful to point out to the public that it was not in the milk business and that the amount of milk it would allocate would not deprive the general public, who had been faced with high milk prices over the past year.[105] The "clean milk" for babies campaign was publicized in the newspapers and the crusade, as it was labelled, had the backing of the Board of Health, the Victorian Order of Nurses, the Hamilton Medical Association, "several prominent women who had on their own convinced the city council to augment the inadequate funds of the Board of Health" and the endorsement of the Spectator.[106] Depots, where milk was available at 1¢ per feeding, were operated by the Victorian Order of Nurses at the market square and at the out-clinic of the city hospital.

The milk was procured from a producer with a record of a clean operation. He supplied milk to nurses at the farm who then diluted it with a sugar solution and bottled it for delivery to the depots. Apparently Dr. Goler's extensive instructions for the procedure were carried out to the letter.[107] Based on the experience of Rochester, the Board of Health anticipated a 50 per cent reduction in infant mortality.[108] When the depot closed on September 17 and the statistics were analyzed, the results were not quite what had been expected. Infant mortality for June, July and August was just 24 per cent lower than in 1908 and only 273 of approximately 1700 babies born in the twelve months prior to June, 1909 had been brought to the clinic. The Spectator firmly denied that the campaign had been a failure. The paper argued that Dr. Roberts was satisfied; he had visited every house where the milk had been used, and would soon publish a report " to show it was one of the best things that ever was introduced in the city."[109]

In an article published in the American Journal of Public Hygiene, the official publication of the American Association of Public Health, Geraldine Steinmetz, using information provided by Dr. Roberts, pointed out that the less than 50 per cent decrease in infant mortality was not "due to the fact that the premise was incorrect but to these facts:

> 1. That the summer was unduly trying.
> 2. That not all infants were fed on the milk.
> 3. That a longer period of time is needed before definite and proven statistical results can be obtained. The doctors who prescribed the clean milk are very gratified with the results in particular cases. [110]

The indirect results were much greater. "All over Ontario much interest has been taken in the movement and both periodical and daily press have

given much space to the question of clean milk." In Hamilton itself, Steinmetz expected that public interest would be directed to

> the passage of regulations relating to the testing of cows for disease, sanitary methods of milking and the keeping of milk at low temperature. A city of 70,000 like Hamilton, is not too large for effective control of the milk supply and it is expected that persistent effort will attain the results desired.[111]

Twenty-five years later, Dr. Roberts confirmed that "one of the most promising lines of public health endeavour" had been the campaign to reduce infant deaths.[112] Roberts' own publications do not indicate a sustained interest in the problem of infant mortality in the city after 1910. This may be because, in 1911, the distribution of clean milk for babies was taken over by the Babies' Dispensary Guild, a group organized by the Milk Commission. Its services were subsequently broadened to include assistance to needy mothers, sewing classes and educational talks.[113] By 1915, the Guild boasted that it had been largely responsible for the ensuing drop in infant mortality from gastro-intestinal disease in the city. Statistics for cholera infantum, however, put their statement in a slightly different light. The clean milk campaign may have had some effect in reducing the mortality from that cause which was at its peak, 15.5 per 10,000 population, in 1908, and gradually decreased to 5.1 in 1914. However, the mortality per 10,000 of population from cholera infantum had been lower in 1901,1902, 1904 and 1907. This statistical data could, on the other hand, be used to support the argument that mortality from cholera infantum in the years 1908 to 1912, like that from other causes, had been the result of social and economic factors which may have been alleviated by 1915. Nevertheless, infant mortality per 1000 live births which, in 1908 (158.3 per 1000) had been higher than in any year since 1903, fell

to 128.6 in 1909 and to 114.2 in 1914. The drop in infant mortality appears to have satisfied Dr. Roberts whose responsibilities for other, equally important, aspects of public health prevented him from following specific problems through to their eventual conclusion.

In April, 1910, the Hamilton Herald, in words reminiscent of the Spectator ten years earlier, noted with pride that "the reputation that Hamilton has always enjoyed as one of the most healthful cities in Canada is being well lived up to," because, in particular, Dr. Roberts had wiped out diphtheria in the city.[114] Roberts had just announced that for the first time since he had become M.H.O. there was not a single case of diphtheria in the city, apparently a major victory for the Health department. The hope that the disease had been eradicated was premature by about twenty-five years, but the publicity attendant on the minor achievement is a good example of the optimistic statements issued to the public by the M.H.O. in his rather obvious attempts to promote the interests of his department. In fact, by the end of 1910, 152 cases of diphtheria, with a death rate of 15.1 per cent of the cases (up from 9.9 per cent in 1909) had been recorded and Roberts was forced, ironically, to admit that "as a matter of fact, since the almost universal adoption of antitoxin in this city, both for curative and immunization purposes in diphtheria, we have never had a higher percentage mortality rate in this disease."[115]

The same sort of misleading messages were issued from the M.H.O.'s office about a polio epidemic in the summer of 1910. The outbreak, which Roberts recognized as the first extensive epidemic of polio in Canada, claimed 12 victims from the 98 who contracted the disease.[116] The epidemic was, at first, labelled "mild,"[117] but, in mid-August, "the cat was out

of the bag" with over 25 cases reported.[118] Just how deliberate this apparent minimization of the polio epidemic was is hard to judge. The cause of polio was unknown in 1910. It was recognized only as an ailment which came in warm weather. It tended to retreat with the onset of cold weather[119] and the victims were usually the young. Doctors at the Annual Meeting of the American Public Health Association held in Milwaukee, which Dr. Roberts had attended, threw up their hands in despair over poliomyelitis and confessed "monumental ignorance" about the causes of, or proper treatment for, the disease.[120] Under the circumstances, Roberts, who was equally uncertain of the value of quarantine, took at least some of the appropriate precautionary measures. He placarded houses, quarantined the patients, and kept all other children in the affected household away from school.[121] Because the disease had a habit of disappearing by the end of September, no steps were taken to close the schools. Ninety-eight cases of polio were identified and 12 deaths recorded before the outbreak ran its course.

Although the supervision of contagious diseases was a major part of Roberts' job, because of the physical expansion of the city from annexation in 1910, more and more of his time was occupied with overseeing and inspecting the sanitary conditions of Hamilton. He believed that "constant watchfulness" in this area was a necessity "if epidemics and high death rates [were] to be avoided."[122] Late in 1910, after the assessment department reported large increases in the population of every ward but Ward 6, the Board of Health announced it would launch a "crusade of cleanliness."[123]

It is unlikely that the members of the Board of Health and Dr. Roberts were surprised by housing conditions in Hamilton. As early as 1905,

members of the Board of Health had inspected the east end and had found the conditions there deplorable. Most of their time had been spent checking the houses of the "foreign population" near the Steel plant. The houses, described as "shanties, constructed of rough boards, small and unhygienic, with the interior many times less inviting that the outsides" consisted, in many cases, of just one room which served as a kitchen, living room and bedroom. Benches were frequently placed around the walls to provide sleeping accommodations. There was "no great demand for washing purposes in the adjacent waters of the bay. For food, macaroni, prepared in various ways seems to be the staple, the cooking being done mostly outside." Although it was not spelled out, the group of "foreigners" referred to were the Italians. They were considered inferior to the "Polacks" whose eight or ten company houses were "markedly in advance" of the homes of the Italians. In conclusion, the board recommended that "while [it] was fully sensible of the fact that these are the usual conditions under which this class of foreigners are contented to exist" there was room for improvement. The Steel Company, it suggested, "could do a great deal to lessen the deteriorating influence which these places must have on the standard of living set by the average Canadian labourer and, in addition, uplift this class of people mentally, morally and physically, besides minimizing the danger to the public of contageous [sic] and infecteous [sic] disease."[124] However, the Board of Health made no specific recommendations to be implemented by the company.

The suspected link between inferior housing and living conditions was not pursued at the time. There are several possible reasons for this apparent failure to follow up to what was emerging, in 1905, as a serious

housing and health problem in the city. During the period of both growth and economic instability which marked the years 1905 to 1909, Hamilton was very dependent on immigration to maintain its industries. Under the circumstances, adverse comments from the health department may not have been tolerated by the City Council and business interests who were anxious to attract new industries to Hamilton. In addition, there was neither time nor money for Roberts and the board to investigate the matter more thoroughly. As a result, the connection between poor housing, illhealth and mortality rates was, for the most part, neglected until 1910. In the meantime, Dr. Roberts had the advantage of discussion on the topic which he had absorbed from the various meetings of public health organizations which he had attended in Canada and the United States. By 1910, he could cite Veiller and others who had established a firm link between inadequate housing and a variety of health problems.

On November 1, 1910, a by-law "respecting the Public Health" was passed by the city council. Most of its clauses were concerned with the sanitary condition of the city and established appropriate penalties for offenders. Citizens were given the right to petition for an inspection of unsatisfactory premises and the Board of Health was granted wider powers to force a clean-up of such premises. If the Board of Health was satisfied

> upon examination by any two of its members and the Medical Health Officer a cellar, room, tenement or building within its jurisdiction occupied as a dwelling place, has become by reason of the number of occupants, want of cleanliness, the existence therein of a contageous [sic] or infectious disease, or that it has become a nuisance, or in any way dangerous to the health of the occupants or of the public,

it could serve notice in writing to make it fit. As well, "no privy vault, cesspool or reservoir into which a privy, water closet, stable or sink is

drained" was to be constructed without the approval of the Board of Health.[125] Armed with the knowledge that this by-law was about to be passed, Roberts and the Board set out to inspect the city. The Board was gratified by "the clean tidy and sanitary appearance" of Little Italy, near the Steel Plant. They were, however, shocked to discover just how many other houses appeared to be "disease breeders", and, especially, "breeders of consumption."[126] Many homes were in a filthy condition and, "in many cases the people who live[d] in them [were] in receipt of good income," a piece of information which surprised Dr. Roberts.[127] The attention of the Board focused on five homes in the east end. Here a one room house sheltered a family of six. Another house, located in Ward 5, at 104 Cannon St. E., a street associated with high mortality from a variety of causes, provoked a wide variety of responses from board members. William Farrar declared that he "would not let [his] dog eat its breakfast there. The stench was awful." Roberts himself had to admit "the place on Cannon street ... is the most notoriously filthy place, I was ever in in my life or ever expect to be." These houses were closed by the Board. Roberts considered the action drastic but necessary because the occupants were "committing slow suicide in attempting to eke out an existence under such conditions."[128]

In March of the next year, Roberts proposed a house to house inspection of the east end of the city. Such an inspection had not been undertaken for at least fifteen years.[129] Board members agreed that such a measure might help disease control in the city and suggested that the Board of Control should be approached for funds for the undertaking. The survey was not carried out, no doubt, because of the cost of hiring the additional inspectors Roberts had requested. Not until 1913 was a type of

social survey of Hamilton conducted by the newly formed Community Council assisted by the Methodist and Presbyterian churches. The report criticized the Health Department because it did not have enough inspectors and because it had limited its efforts to a small area of the city. It confirmed Roberts' charges of shocking overcrowding in the north west and identified a specific "downtown" problem in Ward 5.[130]

Apart from Roberts, Hamilton does not seem to have had any crusaders for better housing or for legislation to regulate construction. Because, unlike Montreal or Toronto, the city lacked a group of reformers whose concern centered on housing, Hamilton does not appear to have been the object of "social engineering" from the top down by experts who argued that improved housing was the key to social progress.[131] Nevertheless, the attitude of the Board of Health towards the foreign element in Hamilton does seem to exemplify Roy Lubove's argument that many of the accomplishments of housing reformers, after 1890, in the United States were motivated equally by the threat that slums posed to the health of the city and by an understanding of the nature and the origin and spread of contagious disease.[132]

The Board of Health, as previously noted, did not undertake a house to house inspection during these years, but, in June, 1911, the census takers gained entry into every house in the city. The tales of their encounters made the front page of the Herald and, although the reports cannot be accepted at face value because of the blatant prejudice, they do add further details to a picture of the physical conditions of the city at the time. Such headlines as "Intrepid Census Enumerator Invades the Wilds of Hamilton's Foreign Quarter. Encountered Gangs as Pleasant as Ball Players who have been benched" no doubt fanned the flames of the already

rampant anti-foreign prejudices of Hamiltonians.[133] Addie Richards, the enumerator, went on to report that "darkest Africa [had] nothing on the 'wilds of Railway Street' (located in Ward 4 in northwest Hamilton) where the 'sons of Italy' lived. Taking all in all, the section was not by a wide margin as bad as similar districts in other cities although in its entirety the location was fit for the pen of an Upton Sinclair or a Rees [sic]."[134]

It is rather difficult to establish just how serious and pervasive the problems of inadequate housing and sanitation were in Hamilton during this period. In 1909, of 16,300 buildings in Hamilton only half, 8,356, had baths.[135] Hence, many thousands of people in the city did not have access to washing facilities other than a basin of cold water. Frequent references to poverty, poor housing and related social issues support the argument that, especially from 1908 to 1912, there were serious social problems in the city which may in turn have been responsible for the rise in mortality during the same years. For example, in 1911, the Spectator was shocked by the revelation that, in Hamilton, there were children with no underwear and households where one coat was shared by all the family members. Such a discovery came about when, in order to publicize the paper's annual drive to raise funds for stockings for needy children, a women reporter, who called herself the Tatler, accompanied the city relief officer, Mr. McMenemy, on his rounds. In a style akin to the muckrakers, the Tatler published her experiences. One home, in particular, made a great impact on her. She and McMenemy visited a dirty three room shack in the northwest which was home to a 33 year old woman and six children under 10. The youngest child was naked. When the mother realized that she had visitors,

she hurriedly dressed the baby in an old pinafore, but, because she had no dress, the woman talked with the relief officer clad only in a petticoat. The children were not in school because they had no fit clothing. From the episode, the Tatler concluded "no, perhaps we do not see the poor upon the streets. They have little clothing, perhaps, but they have much pride, and they shrink from the gaze of the better dressed." The Tatler was sympathetic to the plight of the poor, but she did not understand the causes of such poverty. "There was no one answer", the Tatler wrote. Some people were "tag[ged] by misfortune and illness," while many others were "in the grip of disease, drink and laziness."[136]

In a paper entitled "Insanitary Areas," which he had read to a symposium at the Canadian Public Association Congress on Town Planning and Housing in Montreal in December, 1911, Roberts covered many aspects of the housing problem in Hamilton. He was severely critical of the approach that had been taken to the problem. He pointed out that the remedies for such conditions in the large American urban centres were not appropriate for smaller communities which did not have the problems with tenements.[137] He emphasized the correlation between housing conditions and the rise and fall in mortality rates, using data from England and Wales where the death rate was almost three times as high in slum areas as for the general population.[138] But he produced no comparable statistics for his own city where, as has been shown in the previous chapter, a similar dichotomy existed. He did, however, point out that statistics for diphtheria in Hamilton indicated that 45 per cent of the cases "derived from the districts where the industrial classes are centered, where housing is inferior, the sewer accommodation insufficient, and where overcrowding exists to a greater

or less extent."[139] Both ill health and infant mortality, Roberts argued, were associated with poverty. Moreover, Roberts surmised that where people were crowded together in "sleeping apartments with insufficient light and air," the result would be "immodesty, a lowering of moral tone and a strangulation of ideals."[140] There was no easy solution to the housing problem. An understanding of poverty was essential before housing for the poor could be undertaken by municipalities.[141] One possible remedy for overcrowding that Roberts' own department could implement was a more thorough sanitary inspection of the city, as often as once a month. Yet, any plans would fail, Roberts insisted, without

> the education and enlightenment of the heterogeneous mass of humanity, which forms (especially in this young Canada of ours) the substratum of society.[142]

In conclusion, Roberts, in accordance with his role as an M.H.O., reiterated the dictum that the true basis of happiness was health.

> A healthy people will work and serve themselves and the community. Health and work insure morality. It is not a question of making rules and conditions, to heal and cure, the real issue is to make the conditions of life such that disease, deformity, weakness, should no more exist.[143]

Despite any national reputation that Roberts might have earned for his ideas about housing, in his own city, the M.H.O., hampered as he was by the budgetary restrictions of his department, could do little to alleviate the housing crisis. To give the city council concrete evidence about the widespread problem in the city, Roberts had sometime in 1912 designated two or three of his sanitary inspectors to investigate as many homes as possible. Hence house to house inspections were made in an unspecified time period. These 263 houses lodged 2200 persons, an average

of 8.3 per household. The homes had 1094 rooms, an average of 4.2 rooms per house. Twenty-eight families had only one room and 47 of the families had two. One hundred and thirteen (43 per cent) lived in three rooms or less and fifteen families lived in basements, "more suggestive of a morgue than of a dwelling house."[144] In nearly all cases, the inspectors found unclean conditions -- dirty bedding and foul and unclean lavatories. In many houses there were no facilities at all for washing. Thirty families had to rely entirely on neighbours for water. Fifty houses had only "the unsanitary privy vault"; in 32 of these, there was no way to dispose of "even waste water except in the back yard, the alley or an open drain."[145]

It is not possible to reconstruct the survey using Roberts' data, but it can be restructured for the purpose of exemplifying the problem of housing in Hamilton on a small scale, if we assume that the total population surveyed was distributed evenly across the categories of housing that Roberts described. For example, 10.7 per cent of the 263 households occupied one room. If we assume that 10.7 per cent of the total population occupied houses of one room, then 236 people might have occupied 28 rooms (the total rooms in 28 one-room houses), for a density of 8.4 persons per room. The results of this reconstruction are likely to be distorted although it is not possible to know whether it was the least or the most well-to-do households which were the largest. Nevertheless, the following table illustrates what is probably the minimum density of persons per room by housing cohort. The table can be summarized to explain that more than two-fifths of the sample appear to have lived in quarters where the average number of persons per room exceeded four. Three-fifths had a density which was one-third of that for the first group. This conclusion is verified by

TABLE 31

HOUSING DENSITY, HAMILTON, 1912

Number of Rooms	Number of Households	Per Cent of Total Households	Number of Persons	Total Rooms	Density Per Room
1	28	10.7	236	28	8.4
2	47	17.7	391	94	4.3
3	38	14.5	320	114	2.9
4	150	57.0	1260	858	1.5

the observation in the sanitary inspectors' reports and in the newspapers indicating that in many areas of the city, six and eight persons per room was not at all uncommon. For example, just two blocks from the city hall, a family of six lived in a 14'x14' attic with only a 2'x4' window for ventillation.

The inspection was ample proof to Dr. Roberts that "the germs of the slums [were in Hamilton], making vigorous efforts at growth.[146] Among Roberts' recommendations were municipal housing for the working class, a revised set of by-laws with regard to housing and building, a rapid transit system from the centre of the city to outlying areas and private philanthropy.[147] These suggestions from Roberts are evidence of some awareness and understanding of discussions he surely had encountered at the many professional meetings that he had attended in the previous years.

Some immediate results did accrue from Roberts' report. A Housing Committee consisting of representatives from the Board of Trade, the City Council and various philanthropic organization was organized to draft a plan "to relieve the present congestion."[148] But Roberts' annual reports for the next two years make no further reference to the committee or to any role he may have played in its deliberations.

Roberts complained often in these years about the excessive work-

load carried by his department. In May, 1912, 2000 inspections were reported, a record for the department. For the entire year, 19,223 inspections of various kinds and 6,166 re-inspections were recorded.[149] Roberts envied other cities, especially Boston, where over 200 persons were employed by the Health Department. In comparison, his empire of three to four inspectors was small indeed. Hamilton, Roberts argued, was not "coming near what it should be in its health work which had been made doubly hard by the large influx of foreigners."[150] As a result, there were limits to what the health department could be expected to achieve. Nevertheless, Roberts preferred to work on alone as Health Officer, even though the Board offered to promote Dr. Shain, the Chief Inspector and a veterinarian, to assist M.H.O. Rather than have an assistant who was not, in his opinion, properly qualified, Roberts chose to struggle by himself.[151]

After 1912, Roberts' interest in the city's housing problems seems to have waned. In the summer of 1913, at the height of Hamilton's centennial celebrations, Roberts boasted that the city was "the cleanest on the continent."[152] A year later, however, Roberts pinpointed one area of particular improvement in the city. Although the "foreigners" continued to have dirty houses and yards, the group posed no serious health threat to the community at large. There had been, Roberts contended, no recent cases of smallpox among the foreigners. Moreover, because they had few children, there was a low incidence of diphtheria, measles and other contagious diseases among the new arrivals. The native-born and those immigrants of British origin (who together, in 1911, constituted about seventy-five per cent of the city's population) gave the Health Department far more to

worry about.[153] Other members of the Board of Health were less tolerant of non-English speaking immigrants than Dr. Roberts, perhaps because they did not have the same degree of personal contact that the doctor did with the newcomers to the city. Controller Gardner, Chairman of the Board of Health, remarked, in 1913, that the houses "used by Dagos in the east end district are the nearest thing to perpetual motion ever discovered. They are never empty. In the day time, one shift is sleeping in them. In the night another shift takes to the still heated beds."[154] Controller Morris blamed the foreigners for the smallpox outbreak while a third unnamed controller suggested that the "dago" should do as he pleased because no one cared about him. Morris objected that these foreigners could not be left to live in peace as they wanted because they continually mixed with the English-speaking classes in the big factories where they consisted a health risk for other workers.[155]

To honour Hamilton's centennial in 1913, the city council authorized a commemorative volume extolling the city's many virtues. In keeping with the tone of the publication, Roberts contributed an article entitled "Healthy Hamilton." The piece is very reminiscent of Roberts' earlier thoughts on this topic in 1906, and, in fact, some of it appears to have been quoted verbatim from the earlier paper. There are, however, no references to the quality of housing. Instead, Roberts emphasized the modern methods of sewage treatment which rendered the sewage "non-putrescible" before it was discharged into the bay, and the low bacterial count of the city water supply.[156] The piece is an obvious attempt to present the city in the best possible light. There are no deliberate untruths about the health of Hamilton. On the other hand, the picture of Hamilton is far different from

that drawn by Roberts' annual reports for the same year where he contended that "no observant citizen at all in touch with actual conditions will deny that Hamilton has a housing problem."[157]

The reasons for Roberts' waning concern over housing improvement are hard to assess. Whether there was minimal improvement in the housing conditions, whether Roberts regarded his department's interest in the matter as superfluous in the light of promised civic action or whether there were more urgent matters requiring the M.H.O.'s attention is not clear. The decrease in mortality levels in the city after 1912 may have led Roberts to believe that the problem was being solved and that results were accruing, or perhaps, he may have for the time being at least dropped the issue in sheer frustration over the lack of civic support.

In any case, it seems clear that just as 1912 marks a watershed in the statistical curve of mortality in the city for the period 1900-1914, it also appears to have brought to a close the atmosphere of urgency that had characterized Roberts' activities since 1906, and especially since 1908. During that period, it seems evident from the historical data, the activities of the health department, and, in Roberts' own estimation, that the principal problems of public health in Hamilton were attributable to social and economic factors associated with rapid urban development. By 1912, if these problems were not resolved, they, at least, had the appearance of being under control. Consequently, Roberts' activities for the rest of the period covered by this study tended to be variations on these established themes.

III

Roberts' authority as M.H.O. was enlarged in March of 1912 when a new Provincial Public Health Act was passed by the Ontario legislature,[158] despite complaints from a number of organizations, the Hamilton Board of

Education included. The Board of Education protested angrily against that clause of the Bill which gave the M.H.O. the ultimate power over vaccination. The Board believed that Roberts was "impetuous" and that, in some instances, he might act too hastily.[159] The new act "strengthened the hand" of the M.H.O.[160] He could be removed from his position only by the provincial Board of Health and was, in addition, to be paid a reasonable salary to be fixed by law.[161] Dr. Roberts' comments about the Act were not solicited by the newspapers.

Among Roberts' newsworthy, but rather less glorious, campaigns of 1912 was the "fly-swatting" campaign, a small part of his larger cleanup of the city. The "fly-swatting" program appears to have been borrowed from the American doctor, Samuel Crumbine, whose "ingenious use of the slogan 'Swat the Fly' demonstrated," according to Robert Wiebe "the close relationship between progressivism and the rising industry of advertising".[162] Roberts estimated that if all houses, stables and yards were cleaned up before summer, and the fly population exterminated, typhoid deaths would be reduced by 75 per cent. Another campaign was begun aimed at cleanliness, health and fire prevention under the auspices of the insurance companies in the city and prizes were to be given for the most improved yard and cellar. The city health officers were authorized to check up and cases of neglect were to be reported to the magistrate.

Roberts began his campaign to "Kill the Fly and Save the Baby" just when the Babies Dispensary Guild was trying to raise funds for clean milk. Its campaign began with a talk by Dr. Davey on the merits of saving babies in order that they might be brought up to "Canadian ideals of living, whereas if they died the places were taken by foreigners who know nothing of Canadian ideals."[163] Roberts' campaign was launched with a full page spread in the Spectator. Among the items were recipes for fly poisons and a photo of the "foot of death" magnified several times. The

motto for the campaign was "a fly in the milk may mean a baby in the grave". Poetry was used to point out the dangers of this insect to the public. An example of these publicity techniques which Roberts probably gleaned from his American counterparts follows.

Baby Bye
Here's a fly
Let us swat him, you and I
While we talk
See him walk
And for microbes never balk
Do you think with six such feet
You and I would walk on meat?

Will this fly
Tell me why
He will walk on bread and pie?
Sure he knows
That his toes
Are all covered with typhos,
I should think if I were he
I'd not walk in milk and tea,

Kill him quick
Or he'll make you very sick.
Flies you strictly should avoid
If you would not have typhoid.

Cookery School Magazine [164]

The campaign was, however, misdirected, aimed as it was at typhoid fever in infants, since statistics from the last chapter show that typhoid was not a major cause of infant mortality in the city. Roberts must have believed that his crusade was having the desired effect on overall typhoid reduction. He informed the public that the typhoid rate in the city was at its lowest in three years and that the city's mortality rate for the disease was the lowest of any city on the Great Lakes.[165] The rate was, in fact, the lowest since 1903. But that the decrease was the result of Roberts' fly-swatting programme is unlikely. A more plausible explanation of the decrease is the better sewage treatment, especially in the west end of the city. Roberts continued to protest that effluents were still being

dumped untreated into the bay in the east end.[166]

In September, 1912, Dr. Roberts was elected as Vice-President of the American Public Health Association at its annual meeting in Washington. The Herald, at least, recognized the occasion as an honor for the city.[167] The Herald praised Dr. Roberts for his role in the "big awakening in public health." Roberts enjoyed

> a reputation among city health authorities all over the continent as a brilliant student of his speciality.... The health department has developed from the stage where it took hold of epidemics and handled them until they were brought to a conclusion by medicine or the hand of Providence to the stage where it took hold with a firm hand of every menace to public health and acts in a thousand and one ways to prevent disease.

Moreover, the paper claimed, Hamilton was cleaner than any other city in the province and was said to have a general lower death rate than the average city all due to the Board of Health and its officer.[168] The paper, in this laudatory salute to Roberts, had forgotten his complaints, published just two months earlier in its pages, that although infant mortality in the city was declining, the general death rate was increasing. Roberts had also remonstrated against the low budget for the Health Department. Hamilton, he complained, was the only city on the continent spending as little as 10¢ per capita on public health, and he was extremely ashamed of the Health Department budget of $9000 for a city of 80,000.[169]

The city was forced, shortly, to allocate a larger sum of money to Roberts' department, as the result of what was at first termed "several light cases of smallpox."[170] From November, 1912 to October, 1913, 204 cases of smallpox were reported with 69 in December alone. The epidemic received little attention from Roberts in his annual report for the year, but it was the subject of a later paper entitled "Does Vaccination Protect?"

which he read before the Ontario Health Officers' Association and which was subsequently published in the Canadian Public Health Journal. Much of the information about the epidemic is derived from Roberts' own account. By December, it was clear that the epidemic would not be the mild one originally anticipated. Health authorities considered the advisability of a general vaccination programme for the city. At this point, the anti-vaccination forces began to rally, despite Roberts' warning that no unvaccinated man "in any factory east of James Street" would be safe from smallpox."[171] Vaccination, he cautioned, was the only safeguard against the disease. During his eight years of public health work in the city, he had only encountered one case where a vaccinated person had contracted the disease. He criticized those medical men in the city who were labelling the epidemic as chickenpox. Such men

> did not deserve the protection and honor that the Government gives them. Any man who makes statements of that kind makes a particular ass of himself and does not deserve the safeguard the Medical Act gives him.... Any one who is skeptical can come with me to the isolation hospital, and with one case alone I can convince him that this is a most serious matter.[172]

In spite of the medical profession's alleged mishandling of the situation, 5,000 people were vaccinated by the Health department and another 5,000 by their own doctors.[173] In his article, Roberts labelled the anti-vaccinator as

> a crank on vaccination simply because he did not happen to become a crank on Christian Science or something equally preposterous.... Forgetting that the health officer is a public servant, paid to carry out the law irrespective of his personal convictions, Mr. Anti-Vaccinationist scarcely ever forgets to make his attack on vaccination degenerate into personalities against that official.
>
> One naturally shrinks from laying oneself open to a charge of indulging in diatribe, but to you, as medical men, it must be painfully apparent that the.....[sic] propagandism of the

> ever-increasing 'anti's to scientific progress' constitute more of a reason why thoughtful people should sit up and take notice than do the diatribes of the militant suffragettes.[174]

After this invective directed against the anti-vaccinators, Roberts moved on to a discussion of Hamilton's epidemic. The epidemic, as it turned out, was a mild one, with several cases of disfiguration, but no deaths. Like most epidemics, it exhibited, according to Roberts, the symptoms of a species of smallpox described by Jenner in 1798. Roberts had analysed 214 cases. Of these patients, 153 were over the age of 10, a verification to him that childhood vaccination was very effective in warding off the disease. Only 5 of the victims had ever been vaccinated and even then, when they were very young. In these five cases, the disease had been very mild indeed.[175] Roberts ended his article with one final incident which conclusively demonstrated, in his opinion, the value of vaccination.

> Early in December, a young man of 16 years having smallpox in mild form called at the office of Dr. X. He was examined by the doctor's assistant, prescribed for and sent home. I was notified the next day, and quarantined the house as usual. Our young confrere, who had never been vaccinated and still neglected the precaution, had, at the end of a two weeks' incubation period, a rather impressive demonstration, I fancy, of the fact that not only is smallpox an extremely contagious disease, but no respector of persons, and also that a degree in medicine confers no special immunity.... The one unvaccinated doctor in the city of all those who came in contact with the disease was the only doctor to take the disease himself.[176]

It was the duty of the Boards of Health, both local and provincial, and of those medical men who recognized the value of vaccination, "to teach their ignorant and misinformed neighbours the truth ... about a duty which cannot be neglected, except at the price of indefinite suffering and loss of life."[177]

Roberts may have been prone to exaggerate the lack of support for

his department during this period. Some, at least, of his requests for help were heeded by the city. In September, 1912, Dr. F.B. Bowman was appointed City Bacteriologist and Pathologist. No longer did all examinations of water and other diagnostic tests have to be carried out at the City Hospital or sent to Toronto. Bowman's work was made even easier by Dr. Fidler, bacteriologist for the hospital, who had previously set up nine depots in drug stores where doctors could obtain kits to test for the presence of typhoid, diphtheria and tuberculosis. Daily water samples were analyzed by the laboratory and ice samples were taken from various dealers in the area to guard against contamination from this common source.[178] In all, from October, 1911 to November 1912, 3,965 lab examinations were carried out, more than double that for the previous twelve month period. Of these, 2,839 were for diphtheria. These tests identified 213 positive cases for diagnosis and 253 for release with 139 suspected cases. Tuberculosis sputum tests positively identified 141 cases from 568 tests.[179] It is quite possible that the effective use of the laboratory played a significant role in the decrease in mortality from that cause in Hamilton in the years after 1911.

The increase in lab tests for diphtheria is evidence of Dr. Roberts' determination to eliminate the disease in the community and to educate the parents in proper child care. Roberts' concern was backed up by the verdict of a coroner's jury investigating the death of an eight year old boy in February 1913. The child, who died from diphtheria, would have lived, the jury concluded, had the parents called the doctor earlier. The jury indicted the parents whose duty it was "to summon medical aid when their children showed any sign of sickness, and if this was not done, the responsibility

rests upon their shoulders."[180] Although diphtheria prevention was just one of Roberts' concerns in the period 1905-1914, when he died, he had acquired, according to his obituary a world-wide reputation in this field.[181]

Though his causes were less grand in 1913 and 1914, Roberts managed to keep himself in the forefront of the public health movement and he seems to have relished his clashes with city hall in particular. Mayor Allan publicly chastised Roberts over the bulletins released concerning what was termed a "mysterious epidemic" of sore throat and diarrhoea. Roberts advised Hamiltonians to boil all milk and water while tests were made to determine the cause of the outbreak.[182] The mayor considered it most unwise to alarm the public, that upsetting the public without a diagnosis of the disease was like giving a woman a doctor's book to read. Roberts sprang immediately to his own defense. His "characteristic" reply was that criticism of "this nature falls off me like water off a duck's back."[183] Ever conscious of his "duty," Roberts argued that the public had a right to know what was happening in the city and that he, consequently, could not afford to lose the sympathy of the press.

Because of the increase in visitors expected to the city during its centennial, Dr. Roberts thought it prudent to crack down on the hotels and railways stations where the facilities were filthy and the odor disgusting[184] and on eating places which could be possible sources of contamination. As it had in the past, the health department proposed a clean up of the crowded streetcars. Roberts was supported by the Times which argued that this change was in the public interest and that more cars were essential to reduce over-crowding. Roberts was provoked to criticise public apathy in the matter, averring that "the public ha[d] no spirit of unison, no voice to count for

anything even in such an important question as its health." He pointed out that many of the recent cases of smallpox had in fact been traced to the streetcars.[185]

Until the outbreak of the war, Roberts appears to have confined his activities to matters strictly related to the health of the community, while at the same time, he continued to point out the inadequacies within his department. He reiterated his belief that members of the department, and, in particular, the sanitary inspectors, must be trained professionals who could track down even mild cases of contagious disease in order to control outbreaks. Inspectors, he argued, must possess "detective ability, infinite patience and tact, and, above all, a firm jaw and a stiff backbone."[186]

Roberts himself had an opportunity for detective work in March, 1914, during a whooping cough epidemic. He accused the public of concealing cases of the disease so that children could continue to go to school and wage earners to work. As a consequence of these actions, "the lives of all" were endangered.[187] Before the epidemic had run its course 613 cases were reported along with 18 deaths.[188] The whooping cough epidemic in combination with a six month onslaught of measles severely taxed the physical resources of Roberts' department.[189] There is very scanty information about Roberts' activities in 1914. His report to the provincial board of health for the year contains little more than the requisite figures reporting contagious disease. Had the war not interfered, it appears that Roberts, following the example set by the Ontario Board of Health of which he was now a member, was preparing to investigate the problem of the "feeble minded" in the city, a problem already raised by the Local Council of Women in 1912.[190] According to Roberts' estimates, there were about 500 persons "at large"

who needed to be provided for. Once again, however, public attitudes were a possible obstacle to success. There had already been an attempt to establish a school for the feeble-minded, but, Roberts noted, it had failed because parents would not admit that their children were retarded,

Roberts had no opportunity to pursue his new interest. In August, 1914, the First World War broke out and, early in 1915, Roberts, who had enlisted in the army, was sent overseas. His motives in joining the medical corps, at the age of 37, cannot be determined. He had been sufficiently aggravated by the indifference of city hall to his persistent request for a higher salary in keeping with his profession, that this apparent lack of regard by civic officials for the image of public health in Hamilton may have had some bearing on his decision.[191] Moreover, Roberts was not only unhappy with the scale of operations the city allowed his department but was dissatisfied with the financial arrangements for his department. In his annual report for 1914 he concluded that he

> should be guilty of a serious omission if [he] failed to point out that the work of the woman health visitor which we were the first in Canada to inaugurate has been discontinued because of the fact that sufficient salary would not be paid to secure the desired applicants.[192]

Even the recommendation by the city council that "$634.50 be appropriated to the Board of Health for the purchase of a Ford runabout, including the cost of machine, license, and traction tread tires for rear wheels"[193] had not been passed before it was "absolutely obligatory."[194]

Roberts was invalided home with chronic dysentery several months later, and resumed his position, seemingly more disillusioned and critical of his opponents. Looking backward in 1935 on his thirty years service to Hamilton, Roberts could report favourably on the progress in public health

that had taken place in Hamilton during his years in office. In 1915 that such an improvement in the health of the people of Hamilton was possible, given the obstacles in his way, was not always clear to Dr. Roberts. His task was, he lamented

> at best, a thankless one, but if the adverse criticism levelled at the M.H.O. by those whom he will not permit to endanger the lives of their neighbours, finds an ever listening ear in official circles, and if in addition he is subjected to the petty intrigue and petty vindictiveness of the narrow minded and illiterate, and at the same time receives no real encouragement from the better and more altruistic elements in the community, the evolution of the Health Department to a place of maximum usefulness I fear will be slow and painful.[195]

This chapter has dealt with the work of the Hamilton Department of Health, in general, and, in particular, with the ideas and the activities of the city's M.H.O., Dr. James Roberts, in the period 1900-1915. In Hamilton, as in other public health jurisdictions in Ontario (and elsewhere), the effectiveness of health officers and their departments was determined by a combination of factors: the relative tractability of specific diseases in an age of increasingly scientific but still primitive medicine, the attitude of the public and of their politicians, the economics of public health, the social and intellectual prejudices of health officials at all levels of government, and, finally, by the individual proclivities of men like James Roberts whose effectiveness was invariably hampered by the ineluctable reality of the social, economic and political environment in which they operated.

The period 1900-1915 was not, in Hamilton at least, a "golden age" of public health. Public opinion and official attitudes were sensitive, before 1912, only to the causes and consequences of those random outbreaks of epidemics diseases which threatened them from time to time. The

conditions of daily life in the city, especially the environmental circumstances in which the city's labouring and immigrant population lived, and the health of its children, evidently were conditions to be endured as the price of municipal progress. On the subject of public apathy toward the health reform movement Roberts agreed with Ruskin who affirmed that

> any interference which tends to reform and protect the health of the masses is viewed by them as an unwarrantable interference with their vested rights in inevitable disease and death.[196]

In the absence of an organized public health reform movement in Hamilton, James Roberts and his department stood as the city's first line of defence against disease and premature mortality. Roberts' successes and his failures in this regard arose equally out of his dedication to the work of his department. He appears, at times, to have been unable to distinguish readily between the more and the less crucial issues and problems within his domain, reacting with equal intensity to the trivial as well as to the major issues of the day. More often than not, Roberts' task was complicated by his relationship with local politicians who frequently failed, and sometimes refused, to share his enthusiasms. Consequently, the price Hamilton paid for James Roberts' ministration was the presence of a politically active M.H.O. Robert was equally prepared, at any given moment, to prick the city's conscience on matters of civic well-being, to play the role of publicist for the ambitious city, casting it in the glow of good health for the benefit of external observers in spite of all the evidence to the contrary, and to fight for the material resources to promote his department's work in the face of apathy and hostility. He was a public health professional who, for all of his

shortcomings, saw himself, and was seen by others, as one of a select group of North American experts in his field.

FOOTNOTES

[1] Hamilton Spectator, March 27, 1900.

[2] OSP, 1902, No. 36, p. 94.

[3] OSP, 1901, No. 36, p. 85.

[4] Ibid.

[5] Ibid., pp. 85-86.

[6] Hamilton Spectator, March 19, 1901; March 26, 1901; Minutes, Hamilton City Council, March 25, 1901.

[7] OSP, 1902, No. 36, pp. 92-93.

[8] Ibid., p. 93.

[9] Ibid.

[10] M.F. Campbell, Holbrook of the San (Toronto, 1953), p. 64.

[11] OSP, 1902, No. 36, p. 93.

[12] Minutes, Hamilton City Council, 1902, p. 404.

[13] OSP, 1902, No. 36, p. 94.

[14] OSP, 1902, No. 36, p. 167.

[15] Hamilton Spectator, May 28, 1901.

[16] Ibid., May 30, 1901.

[17] Ibid., June 1, 1901.

[18] Ibid., June 14, 1901.

[19] OSP, 1902, No. 36, p. 93.

[20] Hamilton Spectator, August 8, 1901.

[21] Ibid., August 25, 1901.

[22] Ibid., June 16, 1904.

[23] OSP, 1903, No. 36, p. 83.

[24] Hamilton Spectator, August 26, 1902.

[25] Ibid., September 6, 1902; September 16, 1902.

[26] Ibid., September 24, 1902.

[27] OSP, 1904, No. 36, p. 175.

[28] Hamilton Spectator, May 10, 1904.

[29] Ibid., January 17, 1904.

[30] Ibid., June 16, 1904.

[31] Hamilton Spectator, December 18, 1904.

[32] OSP, 1904, No. 36, p. 83.

[33] Hamilton Spectator Carnival Souvenir (1903), p. 36.

[34] Ibid., p. 33.

[35] Ibid., p. 38.

[36] Hamilton Spectator, March 28, 1905.

[37] Ibid., April 7, 1905.

[38] Ibid.

[39] ARHBH, 1905, p. 20.

[40] Hamilton Spectator, December 16, 1903.

[41] Hamilton Spectator, July 8, 1905; Minutes, Hamilton City Council, By-law 391, August 29, 1904, p. 342; Minutes, Hamilton City Council, 1905, July 7, p. 543.

[42] Hamilton Spectator, January 14, 1904.

[43] Minutes, Hamilton City Council, 1901, p. 113. Note: The Board of Health consisted of the Mayor and four to six councilmen.

[44] Minutes, Hamilton City Council, 1901, p. 113.

[45] Hamilton Spectator, July 8, 1905; Minutes, Hamilton City Council, 1905, July 7, 1905, p. 543.

[46] Hamilton Spectator, March 15, 1940.

[47] Ibid.; J.H. Holbrook, "A Century of Medical Achievement" in R. Wingfield (ed.), The Hamilton Centennial, 1846-1946 (Hamilton, 1946), p. 68.

[48] Barbara Rosencrantz, "Cart Before Horse: Theory, Practice and Professional Image in American Public Health," Journal of the History of Medicine, 29 (1974), 61.

[49] Hamilton Spectator, May 1, 1952.

[50] Hamilton Spectator, May 15, 1905.

[51] ARHBH, 1905, p. 5.

[52] OSP, 1912, No. 20, p. 450.

[53] Ibid.

[54] Ibid.

[55] Ibid.

[56] James Roberts, "Healthy Hamilton", in Hamilton, Canada, Visitors' Handbook (Hamilton, 1906), p. 61

[57] Ibid., p. 63.

[58] Ibid.

[59] Ibid.

[60] Hamilton Spectator, June 20, 1906, August 22, 1906.

[61] OSP, 1908, No. 36, p. 55.

[62] Ibid.

[63] Hamilton Spectator, September 14, 1906.

[64] OSP, 1908, No. 36, p. 55.

[65] Hamilton Spectator, October 27, 1906.

[66] ARHBH, 1906, p. 13.

[67] Hamilton Spectator, September 20, 1906.

[68] Hamilton Spectator, September 21, 1906.

[69] Ibid., October 1, 1906.

[70] Ibid., October 3, 1906.

[71] ARHBH, 1905 - 06, pp. 13-15.

[72] Hamilton Spectator, October 25, 1906.

[73] Ibid.

[74] Ibid., November 7, 1906.

[75] ARHBH, 1905-06, p. 10.

[76] Ibid., p. 13.

[77] N. Sutherland, Children in English-Canadian Society (Toronto, 1975), p. 47.

[78] Hamilton Spectator, March 8, 1907.

[79] Ibid., March 8, 1907; Report of the Medical Officer of Health on Amalgamation of Health Services in the City of Hamilton, 1932, p. 4.

[80] Hamilton Spectator, March 15, 1907; March 30, 1907.

[81] Report of the Medical Officer of Health on Amalgamation, p. 4.

[82] Hamilton Spectator, March 15, April 24, July 4, 1907.

[83] Hamilton Herald, January 20, 1908.

[84] Ibid., April 4, 1908.

[85] Hamilton Spectator, October 16, 1906.

[86] ARHBH, 1910, p. 28.

[87] Hamilton Herald, January 22, 1908.

[88] Ibid., January 22, 1908.

[89] Ibid., June 28, 1907.

[90] Ibid., January 22, 1908.

[91] Ibid., January 24, 1908.

[92] ARHBH, 1910, p. 28.

[93] Hamilton Herald, February 29, 1908.

[94] Ibid., February 12, 1909.

[95] Hamilton, Herald, March 27, 1909.

[96] Minutes, Hamilton City Council, November 8, 1909, p. 532.

[97] Ibid., September 13, 1909, p. 418.

[98] Hamilton Herald, March 27, 1909.

[99] See Hamilton Herald, October 1, 1909.

[100] Ibid., March 27, 1909.

[101] ARHBH, 1910, p. 6.

[102] Ibid., p. 8.

[103] Hamilton Spectator, June 9, 1909; Geraldine Steinmetz "The Clean Milk Campaign in Hamilton," American Journal of Public Hygiene VI (October, 1909), 98.

[104] Steinmetz, "The Clean Milk Campaign," 98.

[105] Hamilton Spectator, June 9, 1909.

[106] Steinmetz, "The Clean Milk Campaign," 99; Hamilton Spectator, July 17, 1909.

[107] Steinmetz, "The Clean Milk Campaign," 99.

[108] Hamilton Spectator, July 17, 1909.

[109] Hamilton Spectator, September 7, 1909.

[110] Steinmetz, "The Clean Milk Campaign," 101.

[111] Ibid.

[112] Hamilton. Its Commerce and Industries (Hamilton, 1933), p. 14.

[113] J.H. Mullen, "A History of the Organization of the Babies Dispensary Guild, Hamilton," Public Health Journal VI (November, 1915) 62, as cited in Sutherland, p. 543-44.

[114] Hamilton Herald, April 3, 1910.

[115] ARHBH, 1910, p. 10.

[116] ARHBH, p. 16, p. 26.

[117] Hamilton Spectator, September 9, 1910.

[118] Hamilton Herald, August 17, 1910.

[119] Ibid.

[120] Hamilton Herald, September 12, 1910.

[121] ARHBH, 1910, p. 18; Hamilton Herald, September 12, 1910.

[122] ARHBH, 1910, p. 21.

[123] Hamilton Herald, October 26, 1910.

[124] Hamilton Spectator, October 18, 1905.

[125] Minutes, Hamilton City Council, 1910, November 1, 1910, p. 680.

[126] Hamilton Herald, October 28, 1910.

[127] Ibid.

[128] Hamilton Times, October 26, 1910.

[129] Hamilton Herald, February 26, March 29, 1910.

[130] Hamilton Herald, January 6, 1914; Report of a Preliminary and General Social Survey of Hamilton, April, 1913, made by the Dept. of Temperance and Moral Reform of the Methodist Church and the Board of Social Service and Evangelism of the Presbyterian Church in co-operation with the Community Council of Hamilton, pp. 18-35.

[131] R. Lubove, The Progressive and the Slums (Pittsburgh, 1962), p. ix.

[132] Ibid., p. 88.

[133] Hamilton Herald, June 28, 1911.

[134] Ibid.

[135] Hamilton Herald, September 13, 1909.

[136] Hamilton Spectator, December 19, 1911.

[137] James Roberts, "Insanitary Areas," Public Health Journal, (April, 1912), 178.

[138] Ibid., p. 179.

[139] Ibid., 179.

[140] Ibid., p. 180.

[141] Ibid., p. 180.

[142] Ibid., p. 182.

[143] Ibid.

[144] OSP, 1913, No. 20, p. 450.

[145] Ibid.

[146] Ibid., p. 45.

[147] Ibid., 451.

[148] Ibid., p. 452

[149] ARHBH, 1912-13, p. 27.

[150] Hamilton Times, June 17, 1912.

[151] Hamilton Spectator, January 28, 1912.

[152] Hamilton Times, July 21, 1913.

[153] Hamilton Herald, July 15, 1914.

[154] Hamilton Times, June 28, 1913.

[155] Ibid.

[156] James Roberts, "Healthy Hamilton," in Hamilton, Canada. Its History, Commerce, Industries, Resources (Hamilton, 1913), pp. 125-135.

[157] OSP, 1913, No. 30, p. 450.

[158] Hamilton Spectator, March 15, 1912.

[159] Ibid., February 20, 1912.

[160] Ibid., March 15, 1912.

[161] J.T. Phair, "Public Health in Ontario," in R.D. Defries (ed.), The Development of Public Health in Canada (Toronto, 1940), p. 72.

[162] R. Wiebe, The Search for Order (New York, 1967), p. 212.

[163] Hamilton Herald, June 20, 1912.

[164] Hamilton Spectator, June 22, 1912.

[165] Hamilton Spectator, August 5, 1912.

[166] Hamilton Times, October 5, 1912.

[167] Hamilton Herald, September 17, 1912.

[168] Hamilton Herald, December 21, 1912.

[169] Hamilton Herald, October 19, 1912.

[170] Hamilton Herald, November 19, 1912.

[171] Hamilton Times, December 16, 1912.

[172] Ibid.

[173] Ibid.

[174] James Roberts, "Does Vaccination Protect?" Canadian Public Health Journal, IV (August, 1913), 444.

[175] Ibid., p. 445.

[176] Ibid., p. 447.

[177] Ibid.

[178] OSP, 1913, No. 20, p. 453.

[179] Ibid.

[180] Hamilton Spectator, February 22, 1913.

[181] Hamilton Spectator, March 15, 1940.

[182] Hamilton Spectator, April 11, 1913.

[183] Ibid., April 14.

[184] Hamilton Times, August 8, 1913.

[185] Hamilton Times, July 10, 1913.

[186] Hamilton Times, January 27, 1915.

[187] Hamilton Herald, March 21, 1914.

[188] OSP, 1915, No. 21, p. 239.

[189] Ibid.

[190] Hamilton Herald, October 2, 1914; Fifty Years of Activity, 1893-1943 (Hamilton, 1944), p. 22.

[191] Hamilton Herald, January 14, 1914.

[192] Hamilton Times, January 24, 1915.

[193] Minutes, Hamilton City Council, July 14, 1914.

[194] Hamilton Times, January 24, 1915.

[195] OSP, 1918, No. 6, p. 184.

[196] OSP, 1918, No. 21, p. 186.

CHAPTER V

CONCLUSION

Looking backward in 1935, Dr. James Roberts reflected that those who had lived "during the growth and expansion of the 'Birmingham of Canada'" had witnessed a transformation in public health.[1] In actual fact, the metamorphosis was even more revolutionary than Dr. Roberts suggested. If the evidence in the foregoing chapters is an accurate depiction of public health in Hamilton at the beginning of this century, the health of this urban society was little better in 1915 than it had been in 1890. In spite of slightly lower general rates of mortality, a Hamiltonian whose birth coincided with the enactment of the Public Health Act of 1884 and his children would, in childhood and as young adults, have been exposed to identical sources of disease and death. In short, whatever progress Roberts saw around him in 1935 was of very recent origin. Such improvements as were made in the health of Hamiltonians before World War I were largely fortuitous and only occasionally the result of direct intervention. Insofar as public health in Hamilton was responsive to human ministrations, the evidence suggests that local voluntarism, subject as it was to the vicissitudes of public apathy, political expediency and private interest, was a poor substitute for legislative reform on a wider scale.

In 1915, patterns of mortality in Hamilton varied little from those of 1900. The overall mortality in the city was approximately 15 per cent lower. In many respects, the geographic and categoric distribution

of mortality remained much as it had been at the turn of the century. Deaths from those specific causes which were considered to fall under the jurisdiction of public health, communicable diseases and infant mortality, accounted, in 1900, for 39.8 per cent of the city's total mortality. In 1914, in spite of the efforts of the health department to ameliorate mortality from these causes, and contrary to municipal propaganda, mortality from this same group of diseases had decreased by only 1 per cent to 387 per 1000 deaths. The decrease in mortality from tuberculosis, which by itself was responsible for a large part of the total reduction in the general mortality rate over the period, was more than offset by a rise in infant mortality and stillbirths per 1000 deaths. Similarly, as noted in Chapter III, the causes of death among various age groups of the city's population, with only a few exceptions, remained relatively stable throughout the fifteen years studied. An analysis of mortality patterns within the city confirms that during the period mortality rates were highest in those wards with the lowest standards of living as determined by assessment values and by population density, and, in particular, that high levels of infant mortality appear to have been associated with poor socio-economic circumstances. From 1900 to 1910, the health of that majority of Hamiltonians who lived in the crowded areas of the city did not improve. Any benefits from the application of the new scientific and medical discoveries of the late nineteenth century appear to have been reaped by that segment of the population living in improved circumstances, one feature of which was a noticeably lower mortality rate.

During these years, the city's Health Department directed its attention, first at the containment, if not the eradication, of contagious

diseases. As the city came face to face with the concomitant problems of urban growth, overcrowding and a rising level of mortality, the department, under the direction of Dr. James Roberts, was forced to expand its traditional role as guardian of the people's health and to campaign more actively and openly against a variety of threats, whether real or potential, deep-seated or transitory, to the health of citizens of Hamilton. It may be argued that Dr. Roberts adopted a less scientific, and more humanistic approach to public health than that of his American counterparts who assiduously directed "specific measures" against "specific diseases."[2] Although he was well aware of current American practice through his membership in professional organizations, Roberts appears to have taken his cue from the early British M.H.O.'s, among them John Simon whose philosophy he often quoted. These men, who grasped the nature of the social problems associated with the urban condition, were convinced of the efficacy of the house to house inspection as a diagnostic tool in preventive medicine and believed firmly that overcrowding increased the risks to both health and morality.[3] On the other hand, such an approach was, under the circumstances, perhaps the logical recourse for Dr. Roberts. In the face of public apathy, civic criticism and budgetary restrictions, Roberts was in no position to be an innovator. Tried and true methods were the more appropriate anodyne in an era when no one level of government accepted the responsibility for social welfare. As the consequence, the public health measures adopted by the city of Hamilton during the period had perhaps even less bearing on what minimal improvement there was in the health of its citizens. In Hamilton, even the sanitary improvements which might, as Edward Meeker argues, have compensated for the adverse effects of urbanization on mortality

were often rejected.[4] Hamilton's civic officials and business interest did not accept the dictum of the noted American sanitarian George Whipple that investments in public health would pay "not only in the satisfaction of having clean and healthful cities to live in, not only in the joy of having relieved the suffering and saved the dying, but in... hard cash."[5]

Many specific causes of mortality in Hamilton and elsewhere were not, it now appears, susceptible to the specific public health measures of the day. The decline in mortality from tuberculosis and diphtheria, which in Hamilton in the period under study accounted for almost half of the total reduction, appears to have been in Hamilton, as elsewhere, largely independent of the activities of the public health movement. On the other hand, in Hamilton, although further analysis of the problem is necessary because of the socio-economic factors involved, it seems that the movement to reduce infant mortality from cholera infantum had some degree of success. Nevertheless, in a decade when general mortality rates were decreasing throughout the western world, mortality rates in Ontario, its cities, and in Hamilton increased. The magnitude of the increase may have been more apparent than real, depending on the trustworthiness of the reported data. It is, nevertheless, clear that disease, mortality and their ecological causes were very real problems. Civic officials and the public in Hamilton demonstrated no consistent concern for public health, however, except when the city was threatened with disease on an epidemic scale, or when the city's reputation appeared to be at stake. If, as Gerald Grob suggests, a society's response to disease and death elucidates its underlying values,[6] then, in the apparent absence of any widespread concern about the quality

of life in the city, Dr. James Roberts' role as Hamilton's social conscience is all the more important.

Roberts' was not the only voice of urban and social reform in the city. For example, the Local Council of Women was active in the censorship movement, in the campaign against white slavery, and on behalf of feeble minded women, although the Council opposed the woman suffrage agitation.[7] Similarly, the W.C.T.U., quite apart from its particular raison d'être, had taken up the cause of day care for the children of working mothers.[8] Among the labouring classes, there had been a long tradition, exemplified by the Knights of Labour, of attempts to improve the workplace.[9] But the collective impact of these and other reforms on Hamilton was not sufficiently profound to prevent the Methodist Church's Department of Temperance and Moral Reform from being generally critical, in a 1913 survey, of the city's social services and of the progress of urban reform.[10] Their review was praised as a "handbook for social reformers,"[11] a catalogue of the work that remained to be done. Against this background the consistency of James Roberts' activities in the field of public health appears the more remarkable. He played the role equally of the professional bureaucrat enforcing often minimal standards of public health, and of the social reformer trying, often against great odds, to advance those standards in the light of recent experience.

Fifteen years is barely sufficient time in which to view these events related to the health of a large urban population. It is nevertheless, the case that the period 1900-1915 and, more particularly, 1905-1912, was critical in the modern history of public health in Hamilton precisely for the reasons suggested by Dr. Roberts' retroactive evaluation of the

transformation that appeared to have taken place by 1935. That transformation was clearly juxtaposed in Dr. Roberts' mind to the conditions he had encountered during his early career as a young M.H.O. in the decade before World War I. It remains to be seen, as the result of further research of what the content and the context of that metamorphosis consisted after 1920. As well, the period from the inception of the Public Health Act in 1884 until the advent of Roberts' enlightened administration has not yet been charted. In the meantime, this thesis has attempted to contribute to the substance of the growing historical debate on the causes of mortality and the efficacy of public health measures during that phase of the public health movement when scientific development and practice had made the application of these new developments to the field of public health at least feasible. The conclusion that many of Hamilton's problems were intractable and that local voluntarism was ineffective conforms to the revisionist trend in recent historiography.

FOOTNOTES

[1] Hamilton Spectator, December 14, 1935.

[2] C.V. Chapin, cited in M. Ravenal (ed.), A Half Century of Public Health (New York, 1921), p. 136.

[3] A. Wohl, "Unfit for Human Habitation," in H.J. Dyos and M. Wolff (eds.), The Victorian City. Vol. II (London, 1973), pp. 608-612.

[4] E. Meeker, "The Improving Health of the United States, 1850-1915," Explorations in Economic History, 9 (Summer, 1972), 373.

[5] G. Whipple, Typhoid Fever. Its Causation, Transmission, and Prevention (New York, 1908), p. 285 as cited in E. Meeker, "The Social Rate of Return on Investment in Public Health 1880-1910; Journal of Economic History, xxiv (June, 1974), 419.

[6] Gerald Grob, "The Social History of Medicine and Disease in America: Problems and Possibilities," Journal of Social History, 10 (July, 1977), 396.

[7] Fifty Years of Activity, 1893-1943 (Hamilton, 1944), pp. 12-15, 20-23, 32-33; The Canadian Annual Review of Public Affairs. 1910 (Toronto, 1910), p. 314.

[8] Hamilton Spectator, February 26, 1900, June 2, 1902.

[9] Bryan Palmer, A Culture in Conflict (Montreal, 1979), pp. 162-170.

[10] Report of a Preliminary and General Social Survey of Hamilton, April 1913, made by the Department of Temperance and Moral Reform of the Methodist Church and the Board of Social Service and Evangelism of the Presbyterian Church in co-operation with the Community Council of Hamilton, pp. 35-45.

[11] Hamilton Herald, January 6, 1914.

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