# THE REBUILDING OF THE CITY OF ST. JOHN'S AFTER THE GREAT FIRE OF 1892: A STUDY IN URBAN MORPHOGENESIS



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# The Rebuilding of the City of St. John's after the Great Fire of 1892: A Study in Urban Morphogenesis

by

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## ABSTRACT

A city's present forms and patterns of land tenure and of relative locations are among the most important of the influences on its continuing development. The constraining influence of some of these forms and patterns can be seen to be so great that they affect even the rebuilding of a city partially destroyed by a major catastrophe.

"Great Fires" were typically nineteenth century events, common to many North American, and other, cities. In St. John's, Newfoundland, the last occurred in 1892. It is around this city and this Fire that the work of this thesis is centred. However, the city and its circumstances are examined not with the intention of providing only an historical geography of late nineteenth century St. John's, but with one of utilizing the time and place as a laboratory for a study of influences which may be expected to be more or less universal.

In order to do this, it was first necessary to describe the city as it was both before and after the Fire, and also to examine in more detail two small sub-areas of the city. Only by placing St. John's and these areas in the context of their times was it possible to use a knowledge of them as the "initial" and "final" states from which the processes of development and redevelopment could be inferred.

Data from two major sources, the city directories for 1890 and 1894, and the insurance atlases for 1880 and 1892 and for 1893 to 1911, along with that from one less useful source, the city tax rolls for the early 1890's, were then used in a statistical analysis of the importance of certain influences upon the process of rebuilding.

Most important of these influences was revealed to be the fragmentation of ownership: streets with the most diffuse ownership of land tended to be those least completely rebuilt. The type of ownership, on the other hand, was related to the extent households displaced by the Fire returned to their original streets. Street patterns, and especially whether or not a particular street had been altered in the aftermath of the Fire, also affected redevelopment, as did the pre-Fire residential or commercial character of the street.

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# I. INTRODUCTION

> The urban landscape records in its morphology the patterns of aspiration, decision-making, accomodation and satisfaction (or dissatisfaction in the case of replacement) of successive generations of residents playing out their roles under particular circumstances of place. Here, particularity of place, as expressed in buildings, open spaces, or spatial arrangements of style, scale, materials and ensemble, captures and holds something of the essence of the human community. More importantly, it conditions the opportunities for and constraints upon change for the community and its members.
>
> Michael P. Conzen, "Analytical Approaches to the Urban Landscape" (1978: 137)

Cities, with their systems of streets, lots, and buildings; their parks and monuments; their waterfronts, commercial cores, and residential districts, possess "landscapes" as real as those of any rural areas. Such a landscape is a morphology observable at a range of scales: from the bird's-eye-view of its shape on the ground to the infinitely more detailed examination of its individual house types.

Like any landscape, an urban one invites an explanation of how it was developed. The examination can begin with the physical attributes of the original place -- its site and situation, and the geomorphology of the region, for example -- but the importance of these original attributes is soon overwhelmed by the built form of the city acting as an influence on its inhabitants, and through them, on itself.

This, of all the forces which will continue to shape the city, is perhaps the most important, particularly in its action as a set of constraints upon these other forces.

These other forces are, in most cases, expressed through the uncoordinated decisions of the city's households, firms, and institutions. These produce a series of gradual and incremental changes: the building of a few shops here or the neglect of a few houses there. While such decisions may have, at first, only the slightest effect on the city as a whole, the cumulative effect can clearly be enormous. Other decisions can have more immediate impact, especially those concerning very large, or sometimes, very significantly located, properties or groups of properties.

But all these decisions are made in the face of certain conditions and constraints: one of these is the legacy of the city's past. This inherited form can be thought of as including both the visible elements of the city -- its "bricks-and-mortar", its streets, buildings, and open spaces -- and the arrangement over the city of certain other elements -- its patterns of land-use, ownership, class. Together, these create a sort of inertial force, which can, at its simplest, provide incentives and disincentives, and act as a control on the speed of development and transformation. In its more complicated role, it can direct this development and transformation into shapes and locations it might otherwise not take.

Obviously, these various roles are not played out without considerable overlap. A delay in the construction of a building, for example, alters its costs, the available technologies, the uses that can be made of it, and thereby, conditions its final form. But, in this thesis, the focus will be on the influence of inertia as it acts directly, and almost as a self-contained system, upon the creation and modification of urban form.

The constraints which make up this system need not be immutable. Most can be partially or completely overcome -- if certain costs are met. Fragmentation of ownership, for instance, constrains the redevelopment of many urban districts, but the land in such districts can be assembled, by expropriation if necessary, if some developer or government sees the benefits as sufficiently great.

Constraints are, however, inevitable. The assembly of small plots into one large one does not remove constraints; it only changes them. And if the land assembly results in one large parcel with one large building, the constraints created by the new form may well be greater than those created by the old.

The constraints created by past forms are inevitable even when the city is physically destroyed. While, at the worst, all of the built forms of the city would be demolished, they would usually not vanish without trace. Property lines would remain as well, unless political events

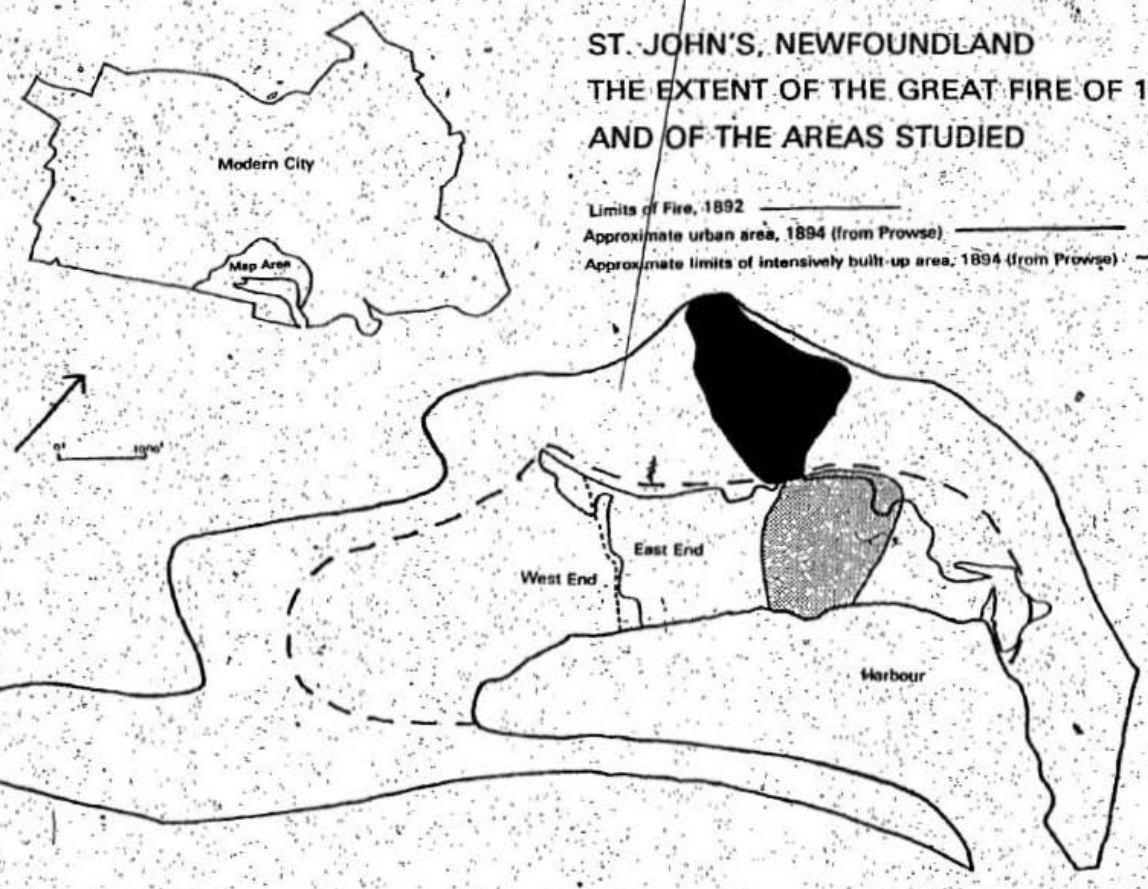
changed them, or rendered them unenforceable. Certain well established notions about the amenity or prestige of various parts of the city might also persist. Finally, as even a devastated area must have bounds, its relationship to the "outside world" would create certain constraints.

Nevertheless, looking at the influence of inertial constraints on the redevelopment of an urban area after a catastrophic destruction, when the strength and nature of those constraints has been dramatically altered, is a useful way of learning more about their influence in more normal circumstances. This is what will be attempted in this thesis. Watching particularly for the influence of the pre-catastrophe street plan, and that of patterns of land-use and ownership, the rebuilding of a section of St. John's, Newfoundland, after the greater part of that city was destroyed by fire in 1892, will be examined. (see Map I:1).

The approach of this thesis will essentially be that of the study of urban morphogenesis -- the study of "the creation and subsequent transformation" of the city and its form (Vance, 1977: 37). An outline of the development of this field of geography will be presented in the next chapter, beginning with a first interest in the descriptions of forms, in and of themselves, to a more recent interest in the development of theories about the processes which underlie the development of these forms and of the functions they contain.

## MAP I:1

## ST. JOHN'S, NEWFOUNDLAND
## THE EXTENT OF THE GREAT FIRE OF 1892, AND OF THE AREAS STUDIED



Next, Chapter III will introduce some of the sources to be used, focusing on the three which provide data for the statistical analysis of the reconstruction of the city after the Fire.

Chapter IV will present a review of some selected works on the late eighteenth and nineteenth century city, along with a summary of these in the form of a descriptive model. In addition, some remarks on the general effect of catastrophe on established urban form will be made.

After these introductory chapters, three basically descriptive chapters are presented. Chapter V provides an overview of the city of St. John's just before the Fire, using contemporary descriptions and statistics, and gives a more detailed look at two of its areas, using data from the tax rolls, directory, and insurance atlas. Of these two areas, the most important, identified as the "study area," is a portion of the burnt part of the city, stretching from the waterfront to the outer limits of the Fire. The other, identified in terms of its major use as the "comparison area", is an area then relatively new and less intensively developed, running from the Fire's limits to the very edge of the city. Finally, as a guide to the significance of these findings, the model presented in Chapter IV will be used.

Chapter VI will continue the story, briefly discussing the Fire and its immediate aftermath, as well as presenting what little documentary evidence there is regarding the

process of rebuilding. Scant as this evidence is, it begins to reveal a few hints as to the importance of many constraints on the process of the city's rebuilding.

Chapter VII is the last of the descriptive ones, providing sketches of the post-Fire city, and of the selected areas. These sketches are considerably less detailed than those of the pre-Fire city and areas studied only because there is less data available.

Next, a series of statistical analyses will be presented in Chapter VIII. Unlike the preceding descriptive chapters, this analysis is confined to that burnt section of the city chosen as study area.

Chapter IX presents some comments on the findings of the preceding work, along with some notes on possible further topics and methods of research.

## II. THE STUDY OF URBAN MORPHOGENESIS

> Urban morphogenesis, though ever expressed in city form, is best seen as a set of processes in times of fundamental transformation of that morphology.
>
> James E. Vance, Jr., This Scene of Man (1977: vii)

The first studies of urban form were anything but studies of urban morphogenesis. Rather, the morphology of the city was taken as it was, its parts catalogued, and their sum described. Aside from an examination of the influence of the original environment, very little attention was given to the way in which the studied form had been created, and virtually none to the way in which pre-existing form had been modified.

It is not surprising, given the nature of most geographic enquiry in the first part of this century, when these early studies were being produced, that many of them are also extremely deterministic. Griffith Taylor's work on cities like Toronto (1942) -- and on St. John's (1946) -- are late and perhaps extreme examples of this type, but one can also cite studies such as "Glasgow and its Geographical History" with its (quite typical) sub-section title: "Glasgow as a Commercial Capital, and the Geological History of the Clyde" (Gregory, 1921).

By the forties, however, even Griffith Taylor had admitted that environment was not the only factor which influenced a town's development. But while these other factors existed, they would not be, he was sure, of much

interest to the geographer (1942, 4). Fortunately, a number of his contemporaries disagreed. For example, a few years earlier, one had argued, in a discussion "On Progress in Geography" that

> When we apply the formula of "site and situation", is it not often evident that site has ceased to have anything but historical interest (with perhaps, some amenity value) while situation must be viewed, not with regard to routes, but with regard to currents? A map shows us four highways converging on a town. Well and good: but we have no knowledge of the place as a going concern until we are told what moves on those highways, how much, and what proportions of the traffic is going straight through. . . .
>
> (Crowe, 1938: 15)

Ten years later, in assessing "The Scope and Status of Urban Geography", another writer suggested four main lines of enquiry in the study of the city:

> first, the physical and cultural conditions that were involved in the origin of the nucleus of settlement; second, the reactions of this nucleus, in its functional and morphological development, to the impact of historical events; third, the life and organization of the contemporary settlement viewed areally, both as a whole and with respect to the differentiations within it; fourth, the interrelations between the settlement and its surrounding territory.
>
> (Dickinson, 1948: 223)

In other words, the study of urban morphology had fallen from an earlier position as one of the major fields of urban geography to that of just one of several. But it was still to experience an even greater decline. By the sixties, geography in general was becoming increasingly interested in process as an object of study, and in theory as the approach to that study. Morphology was becoming something of a

backwater in the main stream. It "remained descriptive and essentially idiographic", and it concentrated almost entirely on the forms, or the physical characteristics, of cities (Herbert and Johnston, 1978: 11).

Building theory required a change from the earlier type of morphological work. Most of these had been studies of particular cities, which were presumed to be unique and suited only to individual examination. Comparative studies, and the comparisons of existing studies of particular places, would, it was now hoped, lead to a new understanding of cities in general.

While this was not altogether a new approach -- H. J. Fleure's work in 1920 comparing several types of city in temperate Europe is probably the earliest attempt -- it was not to be very successful. Without some theoretical background to begin with, without even a few axiomatic principles, these new studies still tended to do no more than repeat "common knowledge", demonstrating, as William Garrison complained, only, for instance, that

> business districts are near the center(s) of town. Because we deal with such simple statements and systems, much of our explanation in morphological work has to rely on statements external to what we include in the morphological system. We remark that the morphology is thus (the morphological system) because an investor happened to put the stockyards over there (unique event not in the system). With a better theoretical orientation we should be able to include explaining events within the system.
>
> (Garrison, 1960: 463)

In addition to the need for a "better theoretical

orientation", there were also two essentially technical problems: the absence of a consistent vocabulary with which to describe morphological features, and the absence of any consistent methods for their measurement. While the second of these has still not received as much attention as it requires (Openshaw, 1974), some progress was made, as early as the sixties, with the first, especially by M.R.G. Conzen in a study of the morphological development of Alnwick from medieval to modern times (M.R.G. Conzen, 1960)[1].

But important as his vocabulary-building was, Conzen's major impact was in his establishment of certain theoretical principles -- and in his shifting from a focus purely on form to one also concerned with functions, and with processes.

By the inclusion of functions, Conzen would appear to be going beyond the original meaning of the word "morphology", or the study of shape or form. While there is, of course, no semantical -- or methodological -- difficulty in using function as part of the explanation, can functions be considered as one of the aspects to be explained? The answer, in practice, has been "yes". Most morphological

1. Conzen's work serves as a watershed in another way. Through it, he introduced into English language studies the rick theoretical background of German studies. The advance was so great, in fact, that according to one reviewer, "its connection with the previous academic literature in the English language is small, much less than a casual scrutiny of its bibliography might suggest" (Whitehand, 1981:13).

work, beginning with Conzen's, has gone well beyond the semantically correct, but otherwise rather limited, sense of the word as the study of form.

There are two arguments in favour of this extension. One is that the pattern of functions, as expressed on the ground, or as represented on a map, is as much a shape as is the form of an individual building or of a street plan. A more important argument involves the very close actual and conceptual link between form and function. Just as it is difficult to think of flour milling without also thinking of the mill, or of an apartment building without also thinking of its residents, it is difficult to think of a complete (modern) morphological study which does not, at least implicitly, deal in both "form" and "function".[2]

Be that as it may, Conzen, by dealing with both, was able to develop some fairly simple statements regarding probable groupings of different types of townscape elements, which could be associated with what he called a "morphological period" (M.R.G. Conzen, 1960: 7). In

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2 One may suggest as further evidence of the closeness of the conceptual link the frequency with which it is ignored or misunderstood. For example, one article refers to what I would call "functional" elements (i.e. building uses, and circulation patterns) as "form elements", but later uses the word "function" (meaning a type of retail outlet) as a kind of "form element" (Johnson, 1978: 59, 67).

addition, by focussing on the interrelations between the two, particularly as function affected the initial development and subsequent modification of form, he was able to construct theories that involved more than simple locational or chronological correlations.

Conzen was, in fact, able to identify certain distinct processes: for example, the "burgage cycle" -- a particular sequence of building development ranging from initiation in the Middle Ages to eventual termination (M.R.G. Conzen, 1960: 123). By including process, Conzen began the shift away from morphology to the study of the creation and modification of form -- or morphogenesis.

Urban morphogenesis is, then, by definition, a process. More accurately, it is a set of processes, which link urban forms and functions through their interrelated development and change. Not only are the forms and functions of today linked, but so too are they linked to the forms and functions of both past and future.

Such a concept is, however, deceptively simple in appearance. To begin with, no study of morphogenesis has yet described, nor is one soon likely to describe, the entire process of morphogenesis for all cities at all times and in all places. Rather, studies have picked out single strands -- the subprocesses -- of morphogenesis. These studies have not, even in the best instances, led to the development of theories so general that they can be applied

to the universal city, but to theories with carefully defined limits as to their applicability. Thus Vance's model of the development of the medieval bastide, for instance, would not be expected to operate fully outside of its own particular setting -- although elements of it might, centuries later, be found at work in the first British colonies of North America (Vance, 1977: 176, 253). Similarly, M.R.G. Conzen's burgage cycle would not be expected to operate outside of its setting -- although M.P. Conzen has suggested it might be respecified as a "building intensity cycle" applicable to certain American cities (M.P. Conzen, 1978: 150).

There have, nevertheless, been made some very broad statements regarding very general processes. One of the most fundamental of these processes is that which M.P. Conzen has described as "the accumulation of structural forms not quickly demolished" (M.P. Conzen, 1978: 146). Others, outlined by Vance, include such processes as segregation and congregation, which help to determine the various groupings of people, occupations, land-uses, and so forth, found in every city (Vance, 1977: 35).

The importance of these statements is not that they are theories, but that they succinctly describe the kinds of processes about which theory can be developed. Segregation and congregation always exist: knowing that simple, but often overlooked, fact is the first step to developing specific theories, be they applicable to the influence of

segregation and congregation in medieval towns or in present-day cities.

In the last decade, most morphogenetic research has adopted the development and testing of such theories as primary goals. In most of these studies, a particular city in a particular time is used as a testing ground, or in Schaefer's words (1953: 230), as a "laboratory" in which the phenomena studied can be isolated. Since these studies begin with theory, they have a usefulness far beyond the mere description of cities. A number of examples could be cited; some of the more obvious are studies of the role of the streetcar in Boston and Leeds (Ward: 1964), and in Boston (by a non-geographer) (Warner: 1962), the effect of changes in the home-workplace relationships on both sides of the Atlantic (Vance: 1966; 1967) and the development of the fringe-belts of various cities (Whitehand: 1967; 1972; 1974; 1975). In addition, as morphogenetic work, with its new emphasis on theory and process, has rejoined the main current of urban geography, morphogenetic techniques have been used to test theories developed outside the field. Here, one can cite much of Whitehand's work, and McCann's testing (1975) of the theories concerning "zones of transition" developed by Burgess (1925), Hoyt (1936), and Preston (1966).

But whether the tested theories have been developed within or without the study of morphology and morphogenesis, they have recently been almost always theories of process,

rather than of simple associations of different forms or functions. Although the procedures used in studies of this sort are not usually described in these terms, they typically involve the determination of two distinct sets of forms and functions at two different time periods, along with a set of processes connecting these two sets of forms and functions.

Ideally, it would be desirable to hypothesize one of these three sets on the basis of a thorough knowledge of the other two, and then to test this hypothesis against what actually occurred. In practice, this is seldom done. Many researchers are less than explicit about the hypotheses they are dealing with, and even in more "scientifically" oriented studies, because of the absence of clearly developed models, and often, of adequate data, there is a tendency to work with hypotheses about all three sets.

However these hypotheses are formulated and stated, the analysis is usually roughly chronological, if not historical. The evidence used can come from a wide variety of sources. The present forms of a city are immediately apparent, although they may not be easily understood, while its functions can be extremely difficult to comprehend. Past forms and functions can be examined through descriptions, paintings, photographs, maps, and whatever physical remains might have survived. Form will give clues as to function, which will, in turn gives clues as to form. Process will be the hardest to grasp, especially when the process is the

result, as it so often is, of the aggregation of a vast number of individual decisions, many of which will be only poorly documented.

Yet process is the significant aspect of urban morphogenesis. And in this thesis, because so little is known about the process by which St. John's was rebuilt after the Great Fire, process will usually have to be inferred through an analysis and comparison of the "initial" state -- the city just before the Fire -- and the "final" state -- the city in the few years immediately following.

Fortunately, the initial state can be quite fully reconstructed. This is done using data which lend themselves to the use of some traditional historico-geographical method. The same methods can also be used, although their success is limited by the incompleteness of the data, in the reconstruction of the final state.

However, not all the generally used methods of historical geography are applicable to the goals or the data resources of this thesis. For example, a lot-by-lot analysis is essentially impossible because there are no complete or accurate maps of either pre- or post-Fire property boundaries.[3] Readers may also note a relative paucity

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3 Scattered references to a few of these do exist, and a reconstruction based on these would be a valuable contribution to the historical geography of St. John's. It is unclear whether enough of them exist to shed any light on the general processes involved in the rebuilding of a city.

of cartographic data presentation. Most of the data were tied to very weak locational information. As a result, the maps that could have been drawn could not have conveyed more than do detailed tables, and would have introduced an intolerable amount of "noise[4]".

Furthermore, the traditional historico-geographical methods cannot tell us much about the transition from one reconstructed state of the city to the other. The data required are simply not available. But the thousands of bits of data available from sources such as directories and tax rolls can be aggregated, and then subjected to some very simple statistical tests. These tests can tell us about the differences and similarities between the two states, and, possibly, about the processes which created or constrained these differences and similarities.

Finally, it is the writer's belief that the study of past forms and processes and of their histories can shed significant light on modern forms and processes. For that reason, this study is intended not so much as a historical geography of St. John's, but as a case study of a particular

4. For instance, a map could have been made showing the numbers of domestics by various streets. But the dots or shadings used would have been meaningless without knowing the numbers of houses, and the density of these houses, as well. Given the available data, the only solutions to the problem would be so complicated that the tabular presentation would far easier to interpret.

set of some of those urban morphogenetic processes which might be expected to occur following a great catastrophe. It is, of course, both historical geography and case study; indeed the two, while easily defined as separate approaches, are in practice inextricably intertwined.

## III. THE DATA AND ITS SOURCES

> The building of a city is such a piecemeal process that except for a few of the architecturally most notable buildings no ordinary historical record survives. To discover who built the [town] one must put together a variety of legal records and published sources, each one of which was intended for a purpose other than subsequent historical analysis.
>
> Sam Bass Warner, Jr., Streetcar Suburbs, (1962, 1980 edition: 189)

In the descriptive, or historical, chapters to follow, several major sources of data will be used. Some of these sources -- contemporary descriptions of the city taken from books and magazine articles, written by both residents and visitors and intended for both real and armchair travelers; local and other newspaper reports; published and unpublished government documents; and some visual records -- are traditional materials for a sketch of a city's past. As such, they need little introduction, other than to emphasize that all of them possess certain, generally quite strong, biases. Travel guides, for example, tend to present only the very best, or the very worst, details about a place, and to stress the colourful. Newspaper reports, no less than government documents, cannot be accurately interpreted without some knowledge of their writers' politics and of the purposes for which they were written. Even a seemingly objective photograph represents a subjectivity in the decisions made to take and to preserve it.

In addition to these traditional sources, three others were used in the descriptive chapters. These also constitute the principal sources of the data used in the statistical sections. Since these -- city directories, tax rolls, and insurance atlases -- present a number of problems in their use and interpretation, they will need more thorough introduction. This chapter will focus on the sources themselves and on the types of data they provide. Further technical notes on the uses of that data will be found in the appendices and, as required, in the text.

All of these three sources contain highly disaggregated data for almost the entire built-up city. It is largely because of this disaggregation, and because of the difficulties this caused in the collection of the data, and in putting it into useable forms, that the detailed statistical analysis of the influence of inertial constraints on the rebuilding of St. John's after the Great Fire must be restricted to such a small study area.

Of the three sources, the directories are the most problematic. One directory exists for 1890, two years before the Fire, and another for 1894, two years after. Other directories for 1885 and 1898 were used occassionally to corroborate information extracted from the first two.

Extracting the information was the initial problem. Both the 1890 and the 1894 directory are organized by

alphabetically arranged last name, without the street guide common to subsequent directories. As a result, it was necessary to read through each volume in its entirety, looking for and copying out the listings with addresses in the study area.

A second problem is the consistency, from directory to directory, of the information presented. The 1890 directory contains name, occupation, place of work, and place of residence, while the 1894 usually omits place of work. A more difficult omission in the 1894 is that of street numbers, in most of the burnt but rebuilt areas. This limits the exactness with which it can be used as a source of data on post-Fire relocations.

But the use of directories as data banks has a number of even more serious problems. First of these is the accuracy and completeness of the listings: how likely is it that a directory represents an unbiased and complete record of a city's population? Unfortunately, most studies, except for one of the earliest (Goldstein, 1954), have found their quality to be rather poor.

These studies have usually been based on comparisons between a directory and a manuscript census (i.e. the individual returns for each person or household) or a tax roll. One researcher, for example, checked a sample of names taken from the censuses for Boston in 1830 and 1840 against

the directories for those years, finding only about 68% of those in his sample. The 1860 Boston directory, compared against census and tax roll, was somewhat more inclusive, with about 87% coverage (Knights, 1969). Other studies have had much the same results, with perhaps the lowest degree of coverage found in an examination of the 1871 directory for Montreal (Cross and Dudley, 1972).

Compounding the problem of incomplete coverage is an apparent tendency for certain groups to be less well represented than others. Knights, for example, found that whites, in two of the directories he examined, were more completely covered than blacks; in another directory, he found higher income groups had the more complete coverage. He also found a slight tendency for outlying areas to have better coverage than ones in the core of the city, while Cross and Dudley found at least one economic group -- business proprietors -- to be better represented than were others.

A final bias is the under-representaiton of women. All adult males, whether working or not, were eligible for inclusion, while adult females were only if they held paying jobs, were business proprietors or widows, or -- sometimes -- were socially prominent.

In view of the intended use of these directories as business tools (Browder, 1942: 6), and the methods by which

they were compiled, most of these biases are understandable. One may expect, for example, that the collection of names was far simpler, and the value, to the user, of each collected name far greater, in the relatively straight streets and uncrowded districts of the middle and upper classes then would be the case in the convoluted alleys of downtown slums. Furthermore, the use of the previous directory as the base upon which the new one would be built suggests a few additional biases: new areas (and burnt but rebuilt ones) may have been less well covered than old ones, while households or firms which had recently moved into an area may have been more likely to be overlooked. Such may also have been true for individuals who had just reached adulthood, or otherwise become newly eligible for inclusion.

Another set of omissions was described by the compiler of an American directory:

> No Directory has been, or ever will be, a correct estimate of adult male population of any city. One warm election will do more in one day, in ascertaining this fact, then we can do in six months. All the Compiler can do, is to visit each house, and carefully take down such information as he can obtain. When he has done this, he has done all that the public can reasonably expect of him . . . there are a large number of people, who either from fear of doing military duty, or from other causes, take effectual means of keeping their names from use.
>
> (Knights, 1969, citing an 1845 directory for Albany, N.Y., original emphasis)

In addition to errors of omission, there are also errors in which listings were made, but made incorrectly: two similar street names confounded, a street-number misprinted, or a name misspelled. There may also be listings which should not have been included at all: the result of the compiler not having eliminated households or firms no longer in an area, or individuals who had otherwise lost eligibility for inclusion.

Finally, there is the problem presented by pairs of identical or almost identical listings. Sometimes they may be the correct listings for two individuals -- with similar names, occupations, and addresses, as might easily have happened, for example, with a father and son. This, in fact, was quite common in the St. John's of the late nineteenth century. But sometimes these duplicate listings are mistakes, occuring perhaps because a person had moved during the compilation period, and was listed at both the new and the old address. Similar mistakes could arise from changes in occupation or in place of work, or occasionally, of name.

For the purposes of this thesis, of course, the important question is how good are the St. John's directories used? Unfortunately, there is no way of answering the question with the currently available data. The tax rolls, as will be seen, are inadequate to the task. The manuscript census for 1891, which would probably be satisfactory (although not ideal) for an evaluation of the 1890 directory

is not available, while no census was taken close enough to the 1894 directory for its evaluation.

One could make certain comparisons between the 1890 directory's claimed inclusion of 10,400 listings and some of the tabulated data from the 1891 census. But, for various reasons, none of these comparisons can be made with any accuracy. For instance, the census gives the population for the city proper (24,823), and for the city and suburbs (29,007). The directory covered an area somewhat larger than the first, and somewhat different from the second.

In any case, we are interested not in comparisons with the entire population, but with a subset, best described as the total number of employed adults, unemployed adult males, and widowed women, plus a few other minor groups. But the census does not give any such breakdowns for the city proper, nor does it give the number of unemployed adult males for the city and suburbs. Employed persons and widows can be summed (9,193) but the utility of this number without even a rough-and-ready guess at male unemployment is questionable. A few other formulations of the required subset are possible, but all contain at least one major component which cannot be derived from the published census material.

Other comparisons would be possible, if the entire directory had been taken into consideration: numbers in certain employment categories, or numbers of households, for example, could be taken from the census, and the

corresponding data counted from the directory. However, even these results would be fairly weak, as neither source documents the methods by which it sorts individuals into various occupations, or in the case of the census, into households.

Perhaps the best one can do is to hope that the St. John's directories provided fuller and more accurate coverage than those studied in other cities, simply because they were made for a smaller population and at a later time. In addition, the problem of errors is eased by one consideration in this thesis: in the most important use of the directory data -- as an indicator of relocation patterns after the Fire -- the data for individuals is aggregated by households. Even though one member of a family could easily be missed or double-counted, it is less likely that the entire household would be. Therefore, this procedure should tend to increase the accuracy of the results. Yet, even this adds another potential bias, if it means that large households may be better represented than very small ones.

The second source can be discussed rather quickly, since it proved to be both simple and of limited usefulness. This source is the 1891 and 1894 tax rolls. These cover only a very small portion of the population, the few who were liable for taxation. However, even this coverage may be somewhat incomplete. The 1891 tax rolls were never even corrected, since before the review procedure had been carried out, the act enabling the tax had been disallowed. It seems that a

number of errors did occur, including the omission of some taxable properties, while many internal inconsistencies can also be seen.

Furthermore, the location of the various properties is not usually given precisely. Street numbers are the only locational information, and even these are often missing. Fortunately, the listings are generally given in sequence, so that the appropriate number can be inferred with reasonable confidence.

Far more important than these problems is the fact that the tax rolls simply do not contain very much information. Unlike the tax rolls of many other cities, which include such information as the ages and occupations of the inhabitants, and the types, conditions, and ownership of the structures, the St. John's assessments list only the names of the taxed at each property, with different sums given under the headings Ground Rent, Freehold, Lessee, and Occupier. These sums are meant to reflect each party's interest in the property, but by what means the values were determined is not known.[1] Thus, the only major use to which this data

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1 According to the 1891 Act (Cap IV, Vic 54): "The valuation for taxing purposes shall be the market value of the property as nearly as can be ascertained, less ten per cent". Nothing is said about how market value was to be ascertained, but it would appear to have been rental value, if any, and otherwise, determined by some "rule of thumb". While there is no record of what this rule was, there does seem to be a rough correlation between street frontage (or perhaps house width?) and assessed value. Other factors were certainly involved, and one of these may have been distance from the water supply system.

could be put was in the approximate delimitation of areas of freehold and leasehold land.

The insurance atlases, by comparison, provided a wealth of information. These are very detailed maps, drawn at a scale of 50 feet to the inch, used by insurance companies as a means of determining the values of the properties they covered. Among the information recorded are such items as the building plan, height, construction material, roof type, and often, function. Street widths, pathways, major topographical features, water systems, and so forth, are also clearly shown.

A city's atlas would consist of several pages, each showing a different area. New pages would be issued as new areas were added to the city. As a result, the dates on these pages record important information about incremental growth, usually at the city edge. Changes within the city -- in other words, in already mapped areas -- were recorded on small slips which were to be pasted over the appropriate spot on the existing page (Hayward, 1973).

These pasteovers present the major difficulty in using these maps. First of all, there is no guarantee that an insurance company would even have bothered to make the pasteovers in areas where it was unlikely to do business. And, as must have happened occasionally, a pasteover made could come undone.

More important is the fact that the pasteovers were usually not dated. This means that the time of a change can only be established as lying somewhere between the original date of issue for its page, and the date at which the entire page was replaced. But, presumably, the atlas-makers would be less vigorous in printing correction slips in the time just prior to the issue of an entire new replacement sheet. Thus an atlas, complete with its pasteovers, needs to be thought of as presenting a picture of the city at a time somewhat before its re-issue date.

Ideally, researchers using these maps would be able to use several copies of a given atlas, one of which could be stripped down to its original state, thereby giving "snapshots" of two different periods, as well as some rough clues as to the sequence of change. However, copies of many of these plans are extremely rare, since the issuing company, Charles E. Goad, typically rented the atlases to the insurance companies, requiring that obsolete plans be returned so that they might be destroyed (Phelps, n.d.: 1-2).

Goad issued three atlases for St. John's in 1880, 1893, and 1914. The locally available copy for 1880 is, as far as could be determined, the only one to have survived, a misfortune all the greater since it is not intact. Within the comparison area, one sheet is completely missing, and, in both areas, there are several large holes. Luckily, none of

those in the area of primary interest present any major problems. Later atlases are more complete, and duplicate copies exist, although in separate archives.

The 1880 atlas contains sheets for the newest part of the study area dated as late as 1888, while corrections seem to have been made until the Fire rendered the task academic. It, therefore, seems to provide a very satisfactory source for the reconstruction of most of the study and comparison areas, with the obvious exceptions being those portions not yet developed by 1892, and those portions where the atlas has been destroyed.

The 1893 atlas, despite its completeness, is less adequate. For the same reasons that the 1880 atlas can be best used to portray the city of the early 1890's, the 1893 atlas can be best used to portray that of the early 1900's.

This would present alarming problems in the use of this atlas to picture the city of the late 1890's were it not for the availability of other sources, particularly the directories. But there is also other evidence (reviewed in Chapter VII) which strongly suggests that reconstruction was, in fact, substantially complete by the end of 1894. If it is likely that new building in any city would be slowed after the completion of such a massive reconstruction effort, it may also have been curtailed, in this case, by a serious financial crisis in 1894 and 1895, which nearly bankrupted the country.

Be that as it may, a large portion of the sheets for the burnt area seem to have been printed with very little detail, other than the rough outlines of the streets and buildings. Correction slips were subsequently issued, but these, as was usual, were not dated. Thus it is impossible to date individual structures, which could have been built anytime between the Fire and 1911, when the last corrections seem to have been made.

But in the aggregate the problem is less important: since we know that most structures in the burnt area had been replaced more or less as mapped, minor deviations can be ignored.

There is one last problem involving these three quite different sources of data. In addition to the long time span of the atlases, the others are never for exactly the same period. For example, the pre-Fire directory is dated 1890, the tax rolls 1891, and the atlas from 1880 to 1892. While such differences are relatively minor, they do mean that the sources are never in complete agreement. Yet any such disagreement cannot unequivocably be called either a mistake in the data, or a result of some real change.

Because of this, the decision was made to take each data source just as it exists, as any attempt to make corrections, without better information, would only add further biases. On the other hand, occasional comparisons between the different types of sources, and more frequent ones between different

dates of the same source were made, for the purpose of confirming certain data. While this procedure did add some biases to the data, it was necessary if the work was to proceed at all. (This is further discussed in the appropriate statistical sections, and in the appendices.)

In the end, one must decide if the data, despite the many problems it presents, is worth using at all. Part of an affirmative response to that question can be based on the fact that, if one wishes to use the St. John's of the 1890's as laboratory, there is, at the moment, simply nothing better. However, the burden of proof must rest upon the strength of the results.

## IV. THE NINETEENTH CENTURY CITY AND CATASTROPHE

> An extraordinary event, the major fire nonetheless disclosed many commonplace patterns of behaviour. These disasters . . . provided flash-points which can reveal qualitative insight into the make-up of urban society.
>
> John C. Weaver and Peter De Lottinville, "The Conflagration and The City (1980: 421)

Many of the cities of the late-eighteenth and nineteenth century English-speaking world have been studied by geographers and by other scholars. Such studies have produced broadly similar descriptions of these cities and of their functional and formal geographies. The "walking" or "pedestrian" city of the time has been characterized by its compactness, often achieved by means of extremely high densities of people and structures, and by the limited distances between homes, jobs, and the shops selling day-to-day needs.

As a corollary of these two very closely related aspects, the city showed only a little functional separation. Places of work, whether factories, workshops, or offices, were scattered all over the city, as were small groceries, pubs, and other neighbourhood shops. Nevertheless, there were some important locational differences. In the Philadelphia of 1774, for example, shipping and related

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1 These terms are from Warner's work on Boston in the 1850's (Warner, 1962).

trades, including that of the larger merchants, were concentrated close to the waterfront. Just away from this area were those tradesmen, such as tailors, hatters, tin- and silver-smiths, who would benefit from proximity to the waterfront and its activity, but who did not need to be in its midst. Finally, towards the edge of the city were those, such as builders, weavers, tanners, and distillers, who needed large amounts of land, and those whose occupations, or lack of them, left them too poor to afford the more expensive central land (Warner, 1968: 11-13).

But these concentrations of different occupations could be quite weak. Warner reports, for Philadelphia in 1774, indices of dissimilarity for several different occupational categories: the highest of these is only 37.2. Curiously, this is for labourers, one of the more general categories, and their low income is probably responsible for their concentration on the outskirts of the area he studied (Warner, 1968: 13).

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2 (Warner, 1968: 13, 226). This index ranges from 0 to 100, indicating the percentage of those in one category who would have to be moved from one area to another in order that all areas would have the same ratio of individuals in this category to total population.

$$D = 1/2 \left| \frac{g_i}{G} - \frac{P_i - g_i}{P - G} \right|$$

By the middle of the nineteenth century, according to most studies, the city was becoming increasingly diversified, with a geography reflecting an ever growing separation of different social classes and economic functions. While most cities were still fairly small, and still retained a general structure of closely related jobs, shops, and residences, most were also developing small concentrations of particular uses. Philadelphia, for example, had, by 1860, an identifiable "downtown, three manufacturing clusters, a small slum, a few black blocks, and occasional class and ethnic enclaves" (Warner, 1968: 50).

The Toronto of the same period, as seen from Goheen's somewhat different perspective, was a "pre-modern" city with a central area containing the homes of the wealthy, and the offices of the administrative and institutional positions they controlled. Beyond this area was a zone containing artisans' workshops and homes. But there was not a neat pattern of annular rings containing different classes. Rather, persons of lower class often lived quite close to, but behind (or above), persons of higher class (Goheen, 1970: 7-9).

Hamilton, around 1853, was also seen as a city with distinct economic areas: a commercial core with "small, specialized retail, wholesale, and financial sections", an outer zone of artisans' shops and manufacturing companies, and an intermediate zone of hotels and boarding houses.

Socially, however, Hamilton was still fairly mixed. In fact, the residential patterns of the very poorest and the very richest Hamiltonians were remarkably similar (Doucet: 1972).

But if cities were beginning to exhibit concentrations, no matter how small, of commercial or industrial functions, there must also have been, by implication, more extensive journeys-to-work. While many of these new longer journeys were from one part of the central core to another, a relatively small number of households had begun to move to the suburbs. At first, the resulting development would have been of the kind described by Burns as the initial use of land for "specialized residence", such as the summer homes or part-time farms of city workers. As Burn's model further suggests, given the nature of transportation at this time, such development would be mostly occupied by high income households (Burns, 1974: 5).

The evidence for this type of suburban development is fairly clear. Doucet comments that, even as early as 1853, some upper class families had sacrificed convenience for the scenic amenities of Hamilton Mountain (Doucet: 1972). Warner has described a similar process outside Boston in the first half of the nineteenth century (Warner, 1962: 13) as has Ward outside Boston and Leeds (Ward, 1964). Later, as new and cheaper forms of transportation were introduced, other workers could also begin to move away from their jobs.

The increasing separation -- both socially and

geographically -- of the different classes is usually thought of as becoming more and more important as the century progressed. Indeed, to many scholars the essence of the British "Victorian city" has been ever sharper patterns of class-based geographical segregation. Even in the United States, despite different ideologies and aspirations, and different causes of rapid growth, cities experienced the creation of upper class enclaves and lower class ghettoes (Ward, 1978: 171). In Britain, migrants from the countryside, and in North America, immigrants from abroad, swarmed into the cities, and found themselves crammed into dirty, over-crowded, but centrally located, housing, while the rich and the middle class took advantage of new forms of transportation to escape to the suburbs.

This is, of course, an over-simplication on many counts, not least of which is that the act of segregation was primarily a reflection of changes in the economic structure of society. In addition, the middle classes tend to be overlooked since society was seen mainly as comprised of two groups, "the rich" and "the poor". But, most important, the class divisions used by various researchers are necessarily artificial and arbitrary, and may bias the results to a considerable, and unmeasurble extent.

Ward suggests that current descriptions of the nineteenth century city are an "enduring myth," reflecting not only the biases of present-day researchers, but also those of

both the social reformers and the threatened elite of the past. Engels, in his work on Manchester in 1844, provides an excellent example (Marcus, 1973), as does the actual progress of housing reform in London, and in Britain as a whole (Wohl, 1977; Gauldie, 1974). The image of a distinctly cleaved society was a useful one for persuasion, whether the purpose of the propaganda was economic reform or the enactment of laws against overcrowding.

In fact, according to Ward, the truly rich had long since moved to the exclusive suburbs, and what was really happening in the Victorian city "was the increased residential separation of the various strata of the poor" (Ward, 1978: 174). The "middle class" were, other works suggest, moving out to the Camberwells of Britain (Dyos, 1966) and the Roxburys and Dorchesters of America (Warner, 1962).

A second criticism is that what the researcher finds is not only dependent on the image he seeks, but also on the scale at which he seeks it. While this problem is inherent in most methods of geographical analysis, it is particularly acute when dealing with data which, on the one hand, are extremely disaggregated, yet, on the other, need to be (usually arbitrarily) regrouped in order to show any pattern at all. In certain studies, for instance, the organization of data may have completely obscured the patterns so well described by Engels: what existed in the interiors of city

blocks was very different from what existed on the streets that enclosed them (Marcus, 1973).

Despite this criticism, some general comments can be made on the form of the late nineteenth century city. Smallness and compactness (at least by modern standards) were perhaps their most salient characteristics. Lots tended to be long and narrow, with the original structures set towards their fronts. In residential areas, as well as commercial ones, the structures were often attached to each other, or at least built right up against their neighbours on either side. In many areas, only a few narrow gaps in the expanse of facades would allow access to the interior of the block.

As long as urban land was cheap, the interior of the block was used for kitchen gardening, the keeping of domestic animals, and other household functions such as storage and waste disposal. Artisans might also have used part of the area for their workshops and related spaces. But as land in the city became more valuable, the backs of the lots would normally have been used more intensively as sites for shops and for residences. The latter were generally somewhat smaller than those which fronted directly onto the main streets, and their occupants of somewhat lower social class. The social distance could have been quite great, as Engels tells us it was in mid-nineteenth century Manchester. That much the same phenomena occurred in North America -- sometimes with an additional racial division -- is demonstrated

in the development of alley housing. Late nineteenth century Washington provides just one example of this (Borchert, 1971-72).

But not all cities experienced this extreme kind of intensification of land use. Some did not because they also experienced little economic or demographic growth. In the rest, however, an important factor seems to be the available technological advances of transportation. In cities where the outskirts could be easily, cheaply, and quickly reached, the process of increasing central land values and increasing intensity of use would be significantly slowed. In these cities, most growth could be accommodated by the incremental expansion of suburban lands, accompanied by a sifting out of the established core those uses and activities which least required or could least afford central space. Then, as the areal expansion approached the limits set by the available transportation, land in both the core and the suburbs would be used with increasing intensity. In oher words, the densely developed and large (with respect to its transportation) city core would tend to be associated with densely developed suburban properties as well.

This is not to say that the suburban area as a whole would necessarily be densely developed. No matter the size or density of the city, some property owners would choose not to turn their land to urban use, resulting in the frequently described pattern of "leap-frog" development. In large

cities, dozens of houses packed cheek by jowl along one side of a street might look out over acres of vacant land, while even in smaller cities, a few terraces might be interspersed with farms. Dyos presents an excellent discussion of this in Camberwell (Dyos, 1966), while Whitehand explores some of the reasons behind the process and its timing (Whitehand: 1972, 1974, 1975).

Nevertheless, the same factors which affect the rate at which large parcels of land in the form of suburban estates or farms are brought into the market for developable land would also affect the type and intensity of development upon them. If pressure on central land was high, it is likely that there would usually also be pressure on suburban land. This would encourage more land owners to bring more parcels into development, and would also encourage a greater intensity of use on these parcels.

Thus, while suburban development would typically be less intense than core development (as trade-offs between space and accessibility were made), a strong relationship between central and suburban densities seems likely. This suggests an efficient method of categorizing the cities of at least the nineteenth century Britain and North America. The key is each city's ability to keep itself within some unspecifiable, but by today's standards, relatively small, "ideal" area determined largely by the available transportation technology. What we may call a "small" city would have been

able to develop within the confines of this area without needing a very intense use of its land. And what growth it did experience could easily be accommodated by gradual increases in density and usually as well, by the gradual increase of its "ideal" area through the improvement of its technology of transportation. The "large" city, on the other hand, would soon exceed this "ideal" area, despite rapid and often unwanted increases in the intensity of its development.

St. John's in the 1890's was indisputably a "small" city. Its population was quite low, as Table IV:1 shows in comparing it with that of several other cities. In 1891, St. John's had a population of 24,823. This number had almost been reached in Philadelphia by 1775, and had been exceeded in Toronto by 1851, and in Hamilton, Halifax, and Saint John, by 1871. Furthermore, the population of St. John's had grown much more slowly than had that of other cities: Hamilton, for example, had a population in 1851 which was five times what it had been only fifteen years earlier, while St. John's had grown only half that much in the seventy-five years before 1891. Such a low rate of growth may be partially explained by the fact that St. John's was very much older than cities like Toronto and Hamilton, which, because they were so young might be expected to grow rapidly. In this regard, as in others, St. John's was more like Boston or Philadelphia than it was like inland Canadian cities. Yet the rates of growth for these American seaboard cities also far exceeded that for St. John's.

TABLE LV:1

RELATIVE SIZES OF SELECTED CITIES AT DIFFERENT DATES

| Place | Date | Population | | Source |
|---|---|---|---|---|
| St. John's | 1815 | 10,018 | | Prowse |
| | 1891 | 24,823 | "within the limits of the municipal act" | Census of Newfoundland 1891 |
| | 1891 | 29,007 | "city and suburbs" | |
| Hamilton | 1836 | 2,846 | | Katz 2 |
| | 1851 | 14,112 | | Katz 16 |
| | 1871 | 26,716 | | Census of Canada 1890-1891 |
| | 1891 | 48,980 | | |
| Halifax | 1871 | 29,582 | | Census of Canada 1890-1891 |
| | 1891 | 38,556 | | |
| Saint John | 1871 | 28,805 | | Census of Canada 1890-1891 |
| | 1891 | 39,179 | | |
| Toronto | 1851 | 30,775 | | Census of the Canadas, 1851-52 |
| | 1891 | 181,220 | | Census of Canada 1890-1891 |
| Philadelphia | 1775 | 23,739 | "total urban" | Warner 68, 12 |
| | 1860 | 137,756 | "Old City" | Warner 68, 51 |
| | 1860 | 565,529 | "Philadelphia County" | Davis & Haller |
| | 1880 | 847,000 | | |
| Boston | 1850 | 187,676 | "the pedestrian city" | Warner 62, 179 |
| | 1900 | 504,553 | "the pedestrian city" | |
| | 1900 | 1,141,544 | "ten-mile [radius] metropolis" | |
| Manchester, England | 1853 | 296,000 | | Census of Canada, 1851-52 |

A final comparison is useful, even if varying boundary definitions render it rather imprecise. In 1860, the "Old City" of Philadelphia held less than a quarter of the population of its county. In 1900, Boston's "pedestrian city" (essentially, the area of the "ideal" 1850 city) held less than half the population within a ten-mile radius. In contrast, St. John's "within the limits of the Municipal Act" had a population in 1891 which was five-sixths the population of its electoral districts, otherwise defined as the "city and suburbs". In other words, not only was St. John's relatively small, but it was set into a hinterland relatively unpopulated.

In 1891, St. John's was also clearly well within its "ideal" area, even without a streetcar system. In a half-hour, one could easily walk up the steep hill between the busiest parts of the waterfront and Military Road, through the suburbs, and out into the country, while walking to other suburbs along the slope of the hill would have taken only a few minutes more.(See Map I:1)

Since most of the studies so far discussed are of cities both bigger and faster-growing than was St. John's, the patterns and processes they describe must be applied to that city with great care. But there will be many shared similarities with the "small" cities of 1774 Philadelphia, 1850 Boston, 1853 Hamilton, and 1860 Toronto, as there will be even with the "large" cities of 1853 Manchester, 1860

Philadelphia, and 1900 Boston. It is not so much the dates of development which shape cities as the conditions under which development occurs. Thus, when Vance speaks of the "stage of morphogenesis", he refers, in part, to the pressures for and against development, and the set of constraints under which it occurs, rather than its particular chronological place (Vance, 1977: 22).

Proceeding from this general assumption of comparability, a number of hypotheses about St. John's in the late nineteenth century were developed[3]. The city, although small in area, and with a fairly compact development, would not have been, by the standards of "large" cities, either densely peopled, or densely built up. In one sense, there was probably very little functional differentiation: factories, shops, offices, and residences of all sorts and classes were to be found all over the city. Most people worked either in, or not very far from, their homes, while the small businesses they would have utilized on a more or less daily basis would have also been nearby.

Yet, there is one form of functional differentiation which one might reasonably expect to find. The principal

3 Inescapably, the author's prior knowledge of St. John's present morphology, and of some aspects of the data, must also have affected these hypothesis.

economic functions, import and export trades, and related wholesaling and retailing activities, would obviously have required a waterfront location, and this localization, in turn, would have created certain peripheral localizations. Some of these would have encircled the waterfront, where there would have been a band of activities intended to serve and to profit from the harbour's workers, visitors, and residents. Hotels and boarding houses, saloons and restaurants would have been here, along with numerous small shops making and selling a variety of goods for seafarers and merchants. But despite an apparently commercial face on its major streets, there would also have been considerable residential use: flats above the shops, and houses and tenements on the minor streets.

The larger part of the central city, lying beyond this band, would have been an area of very mixed social and economic uses. A number of small factories and other businesses would have provided jobs for all classes of people, most of whom would have lived quite close to their work. In addition, there would have been numerous artisans, working out of their own homes, as well as the ubiquituous grocers, bakers, and pub-owners.

Finally, there were two other sorts of district, located at the edge of the city. One, which is even now quite morphologically distinct from the rest of the city, held what were then fairly new, and in some cases, extremely large, single family homes set in generous lots. But though this area was clearly primarily residential and upper class, even

single family homes set in generous lots. But though this area was clearly primarily residential and upper class, even it is expected not to have been entirely without shops, other places of work, and some lower class residents.

The second type of district, also fairly new in the 1890's, was probably more similar to the older districts of the city. This is true despite an avowed intention to build some areas as safer and healthier alternatives to the rest of a crowded wooden city (N.I.P., 1978: 6). Nevertheless, the structures and lot patterns, and presumably the pressures and constraints on development, were such that many of the same conditions as existed in the older districts were to be recreated here. Yet certain differences can be hypothesized, particularly in the composition of this kind of suburban district's occupations and land uses. Most important of these is probably that occupations providing lower incomes, such as those of labourers and, perhaps, even fishermen, and uses which were especially land-extensive would have been more common in this type of district than they would have been in the older, more central ones.

The hypothesized pattern, as it has been described so far, is one based on both economic functions as expressed in land uses, and social functions as expressed in occupational distributions. Where people lived is assumed to have been principally determined by what and where their jobs were, and this, in turn, to have been principally determined by the nature of the goods and services produced in those jobs.

The first half of this assumption is sufficiently far-reaching that it requires some qualification. Many other factors such as social and family ties, traditional attachments to one part of the city or another, the possession of property, and so forth, would also have been involved. Another factor would come into play where more than one member of a family was employed, since it would not always have been possible for all members to have been near their jobs (Ward, 1978). Nevertheless, such proximity can be assumed to have been desirable enough that it ought to have had some effect on the residential patterns of the city.

But beyond this, in looking at the city in greater detail, a more subtle sorting of social classes by residential location is expected to emerge. This is the arrangement, previously described, of lower class housing in the interiors of blocks which held commercial uses, or housing for the "better" classes on their major streets.

Such a pattern is usually (although not necessarily) associated with a dense use of land. But St. John's was still a "small" city, and therefore, not particularly dense. As a result, there would only have been a few areas where this pattern of residential location can really be expected to have existed. Be that as it may, a quick glance at the morphology of these areas, via the insurance atlases, strongly suggests that wherever the interiors of major blocks were built up, the pattern is likely to have existed.

In one further, and very important, respect was St. John's different from many of the cities discussed in the first pages of this chapter. Like many of the cities of Great Britain, many areas of the city were built up under a leasehold system of property tenure. This means that the owner of a parcel of land rented it, for terms of several decades, to individuals or firms who would agree to develop it, or in some cases, to repair its existing structures. In pre-Fire St. John's, typically, a ground lease would have had a term of about 40 years, although both longer and shorter leases existed. "Repairing and improving" leases, under which the lessees were required to bring structures up to stipulated standards, and "building" leases, in which they were required to put up structures of stipulated type and quality, both ended in the reversion, at the end of the term, of all property and improvements to the lessor.

Needless to say, the building owners need not have been the occupants, and since, in most cases, the parcels involved were large enough for several structures, a third layer of tenure was nearly always involved. And sub-letting and other complications, could always have added more layers to the basic three of land-owner, building-owner, and occupier.

The development of land by such a system could obviously have affected the urban form. Most significantly, it would have provided a mechanism by which a ground lord could have had land developed, at another's expense, yet have retained

control over both the land and the development. This clearly meant that large areas of the city could be built to one person's design, whether this was maximum rents or some more altruistic goal. But actually maintaining such areas, once built, to this design, may often have proven more difficult. This was certainly true in British cities as has been particularly well documented for London (Olsen, 1964) and Glasgow (Kellett, 1961). Indeed, whether or not the complications of tenure introduced by the ground lease system helped or hindered the process of deterioration has been a matter of considerable debate, especially during Britain's long attempt to do something about the "Housing Question" (i.e., the poor and the slums they lived in) in older cities (Wohl, 1977: 244).

Other parts of St. John's were built as freehold properties. But even these properties, where land and building were owned by the same person, might be, and often were, let and sub-let, again introducing several layers of tenure to a property.

In the context of this thesis, the issue of tenure suggests a few additional hypotheses. First, if land tenure had had morphological effects, it ought to be measurable. Areas of different tenure ought to have different locational patterns for both commercial and residential uses, different densities, and so forth. The more important hypothesis is <u>after</u> the Fire, the rebuilding process would also have

varied according to tenure pattern. But hypothesizing about the nature of these differences is impossible without knowing the answers to a number of questions.

For example, in dealing with differences in the rebuilding process, we need to know if ground lords could have used the Fire as an opportunity to have their properties rebuilt to a new design, or if they were locked into the old ones by their leases. And, to what extent were lessees bound to the land which once held their structures?

Curiously, there is little information with which to answer these questions. What is known is that, by and large, tenure patterns did not change after the Fire. Based on this fact, the hypothesis -- very tentatively presented -- is that, if anything, the owners and developers of leasehold land would have had less opportunity to redesign their lands and buildings than would have had freeholders.

But how much can it be expected that land owners of either type would take advantage of this opportunity? At first glance, a catastrophe such as a Fire seems to create a clean slate on which an entirely new and different city can be drawn. Yet the historical experience suggests this seldom occurs. For example, the Great Fire of London in 1666 did not result in that city's redevelopment to a radically different plan (Reddaway, 1957); neither did the Great Fire of Chicago in 1871 (Fales, 1972), or the Earthquake and Fire of San Francisco in 1906 (Bowden, 1970) result in radically different cities.

Changes, without doubt, did occur. One of the most volatile elements appears to have been building style (Bowden, 1970, de Mare, 1975, Weaver, 1980). These changes can be thought of as a response to the catastrophe, either as attempts to reduce the risks of a repeated one, or as the use of one as an "opportunity" for the adoption of a more modern look or of new building techniques. But even these really quite minor changes were subject to the constraints of previous form, particularly, in this case, the size and shape of the available lots.

While these relatively minor changes will be touched upon in this thesis, the most important topics will be changes -- or lack of change -- in street pattern, in size, number and use of structures, and in numbers and locations of firms and households.

Some hypotheses can be developed in considering the impact of a catastrophe, such as a fire, on a city. The most immediate and overwhelming effect is, obviously, the disappearance of homes and places of work, resulting in the complete and complex alteration of whatever relationships might have previously existed between the supply of, and the demand for, land and buildings.

Those structures which survive, either within the area of destruction or in other parts of the city, would, generally speaking, become more valuable. In the very short run, of course, the demand for existing structures would be dramatically increased. In the long run, however, the demand

for structures (existing or yet to be built) would probably be lessened as some firms and households would decide not to rebuild: a catastrophe can be expected to weed out the more economically marginal of firms, for example, or to provide the final nudge for households considering relocation. But any such decrease in demand would clearly be outweighed by the sheer loss of structures.

In contrast, any catastrophe-induced reduction in the demand for land would be met with an enormous increase in supply. Yet the vacant land created by the catastrophe would likely be far less desirable than otherwise comparable land outside the area of destruction. Such land would be unencumbered by the physical remains -- rubble, derelict chimneys, foundation holes -- of previous uses. And the almost universal tendency of the powers-that-be, after a catastrophe, to try to improve upon previous conditions (Prince, 1920), presents other problems: the delays of waiting for new street lines to be surveyed, new plans to be issued, and new buildings approved. As a consequence, especially for those unwilling or unable to rebuild at their old locations, sites in the undestroyed area may often be preferable.

Applying these ideas to St. John's as it was immediately after the Great Fire suggests that, within the burnt areas, there would have been some loss in numbers of firms and of households, and, as a result, in the numbers of structures

they would have occupied. This would presumably have been offset by increases in numbers outside the burnt areas.

Furthermore, in the area of the Fire, there would have been changes in the types and sizes of structures, while, over the entire city, there would have been changes in the types, and mix, of uses. These changes would have been the result of firms or households from the burnt areas taking the Fire as either incentive or "opportunity" to adjust form to function, in situ or by relocation.

In more detail, it is hypothesized that where the pre-Fire form and function had been beneficial -- in the sense that they had provided their owners and users with acceptable levels of either (or both) profit and amenity -- the rebuilding would have replicated, or at most, made slight improvements upon, what had existed before the Fire. For most commercial uses, and for middle and some upper class residential uses, this might have meant the new structures were a little bigger and a little more stylish than what they had replaced. For those entrepreneurs who housed the poor, it might have meant some increase in the densities, and some deterioration in the conditions in which their tenants would live. On the other hand, the class of people who had already begun to resettle in the newer parts of the city would have found the Fire a strong additional incentive to move, often thereby freeing once residential space for more profitable economic use.

But all these changes would have occurred only in the context of certain constraints: the pre-existing patterns of streets, of land ownership, of location, of watermains and sewers, and even of the remnants of burnt-out properties. Strongest of these may have been the inertial effect of the street plan. From the literature already cited, one might suspect that very little street modification would have occurred. However, in St. John's, many small and a few quite major changes were made.

Yet these changes, in a very real sense, did not so much remove constraints as add to their effect. Ownership patterns remained unchanged, as did the relicts of old uses: where street patterns were altered, the need to modify these as well is hypothesized to have delayed, and perhaps, to have restricted, development. More particularly, this hypothesis states that the modification of certain parts of the burnt district's street plan, but not of others, would have led, in rebuilding, to different structural and economic patterns. Where the government made only minor modifications to the street pattern, changes in form and function would -- in the absence of other influences -- also have been minor.

Two of these other influences have already been mentioned. One is the extent of beneficial returns to an area's properties, which would clearly have to have been much greater, were the area heavily modified, before its firms and households would have considered rebuilding rather than

relocation. While this escapes direct testing, it is hypothesized that key locations, such as the waterfront, would have been jealously retained.

The second influence is the type of ownership. Beyond what has already been discussed, it is suggested that large areas of land under one owner could be more quickly redeveloped than land under more fragmented ownership. This would be true whether the single owner were a freeholder or a groundlord, but, as already discussed, ground leased property is assumed to have been less likely to be differently redeveloped than freehold.

In summary then, four major influences on the redevelopment of St. John's after the Great Fire are suggested. Three of these -- the effect of changes in the street pattern, of location, and of type and size of ownership -- can be directly tested. The fourth -- the post-Fire viability of pre-Fire forms and functions -- can only be hinted at (through, principally, the intensity and type of land use).

But before turning to the analysis of the process of rebuilding and of the influence of these contraints, it will be useful to introduce the city, and especially the small portion of it selected for most detailed study. The three chapters to follow provide the historical background needed for the examination of constraints and their effects on change; in addition, they will help to place St. John's in the context of the "typical" late nineteenth century city.

# V. THE CITY BEFORE THE FIRE: 1880-1891

> St. John's is a unique little town . . . at once filthy and picturesque.
>
> "Portia", 1886

By 1891, St. John's had become a city of nearly 25,000 people. While St. John's had long been Newfoundland's principal settlement, and the centre of its economic, political, social and cultural life, the city had nevertheless only recently begun to acquire the trappings of a real municipality. Until 1888, the colonial government had had direct control over what few municipal services existed; in that year, it had reluctantly granted a limited incorporation. Even then, the government retained some control: of the seven council seats, two were to be filled by government appointees, the rest by municipal elections. Nor did this council have all the rights and responsibilities usually associated with municipal authority (Baker, 1975, 1976).

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1 Newfoundland, at this time, was a British colony, with its own elected House of Assembly. The House could, with certain restrictions, pass legislation, but such legislation was reviewed by, and could be disallowed by, the Crown through its Colonial Office, and its appointed Governor.

2 It is convenient to follow contemporary usage: the municipal government was called "the council", the colonial one "the government".

But the city was maturing. Municipal improvements had already included a number of street widenings, the introduction of side drains, and the augmentation of the sewer system (Harris, 1891). Property taxes were authorized in 1891 (54 Vic, Cap IV), and in order to keep the assessments rolls, the first system of street numbers had been introduced (Evening Herald: April 28, 1891). Private initiative had led to the electrification of parts of the city (Wadden, 1957), while planning for the first street railway had almost been completed (Wadden, 1965).

Despite some of its very obvious drawbacks, the people of St. John's were quite proud of their city. The Reverend Moses Harvey, a locally renowned historian and journalist, as well as a clergyman, fairly glowed in his descriptions of it. He admitted that the city had its problems, but insisted that things were rapidly being improved:

> Already, on the summits overlooking the business part of the city, houses of a superior description are erected; and these will ere long grow into crescents and squares, and form the fashionable quarters. Water street, the principal business street, presents a very substantial though not handsome appearance, the houses being of stone or brick. Shops, stores, and mercantile countinghouses occupy the ground floors, while the merchants and shopkeepers live in the upper stories.

On the other side of these buildings, stores, warehouses and wharves projected into the harbour. The shops here were generally "handsome", but

> in other parts of the city the houses are for the most part of wood, and many of them are dingy and commonplace. Of late years, however, taste has been developing and houses have been built of a superior description.
>
> (Hatton and Harvey, 1883: 125-26)

Visitors from away were less impressed. Most came by sea, and remarked first on the grandeur of the cliffs and of their surprise at the sudden and dramatic appearance of the city through the narrow gap at the entrance of the harbour. Of the city itself, the common first impressions were the prominence of the Roman Catholic cathedral, the general filthiness of the place, and the absence of a satisfactory hotel.

One of the more sympathetic of these visitors described the city as:

> crescent-shaped and built upon the steep slope of a hill. The houses rise one behind another in a series of irregular terraces . . . .
> The base or waterfront section . . . . is dingy, filthy and old without being picturesque. The modern and residential district is on a plateau at the top of the hill. At the foot of the city an irregular line of wharves and piers extends for a mile or two, and parallel with the shore-line thus formed is Water Street, the principal thoroughfare.
> The harbor turns to the west from the Narrows, the northeastern shore curving around to the city, whose extreme wing only skirts the base of Signal Hill. On the opposite shore the only buildings are light frame huts and storage warehouses, the rocky soil and rugged surface affording no foundation for heavier structures. Above these buildings [are green hills with herds of goats, pine-clad summits, and the occasional farm and garden. At the riverhead,] villas are to be seen dotting the slope like dolls' houses on the mossy bank.

> In strange contrast to this rural picture is the line of wharves over the harbour. They are somewhat carelessly built, are in state of more or less dilapidation, and are generally redolent with a fishy odor that, indeed, pervades all the business quarter of St. John's. Water Street is as dirty and shiftless-looking a thoroughfare as one could find in America. It abounds with general stores, all most old-fashioned in themselves and in their wares. The street is not properly paved, and owing to the humidity of the atmosphere is usually extremely muddy . . . ."
>
> (Anonymous, 1890)

That the city was filthy is indisputable. The sewage system was inadequate, despite the fact that surprisingly few houses were properly attached to it. In 1886, the government engineer reported that, in a survey of 3,816 houses, 3,158 were "Without closet, hopper or sink, using pails, and depending on Sanitary force for removal of waste". Another 161 were not even visited by the men and carts of the Sanitary force.

In many cases, waste simply flowed through old watercourses, over which houses and other structures had been built. They debouched directly into the harbour, where, the engineer commented, "the three conspicuous features of a

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3 The engineer does not mention how many houses in the city he did not visit. But the survey must have included very nearly every house in the city. According to the 1891 census, there were 4,536 inhabited houses in the city and suburbs. The suburban area held about 4,000 people, and by using the average number of people per house in the city and suburbs (6.4), an estimate -- probably a low one -- of about 650 suburban houses can be made. This suggests that five years after the engineer made his survey, the city had, perhaps, 3,886 houses, or only 70 more than he had checked.

public cove [were] as a rule, a sewer outfall, a public closet and a fish stand" (Burchell, 1887: 934, his emphasis).

The smell seems to have been overwhelming -- and fishy. Not only were there fish stands in the coves (the areas leading from Water Street to the wharves; see Map V:3) of the commercial district; but stages and flakes, where fish was filleted and dried, lined most of the rest of the harbour.

But the waterfront was still a place of residence, despite its odour and its muddy streets. The premises of the merchants ran from the harbour itself to Water Street, each premise with its complex of warehouses separating the shops facing the street from the wharves jutting out into the harbour. In addition, many still contained some residences. On the other side of Water Street, and on some other commercial streets, the common structure contained a ground-floor shop, and upper-story residential quarters.

From the descriptions, there would appear to be two other types of residential district. One, about which very little information could be found, seems to be the kind of area in which all those who were less than solid (i.e. monied) citizens lived. Their houses were "mostly low and unpainted wooden buildings, crowding out on the sidewalks, and the general appearance [was] that of poverty and thriftlessness" (Sweetser, 1891: 191).

The second type of residential district was in the suburbs, where many of the middle and upper classes were

building new houses. If these did not, by whatever magical process, "grow into crescents and squares", they were larger and more luxuriously appointed than most of the earlier residences had been.

The descriptions quoted so far imply a fairly homogeneous city (or, at most, one which varied in a quite regular way and was divisable into the harbourfront, the suburbs, and a poorly defined remainder). But certain other distinctions were made between the East End -- in which the study area of this thesis lies -- and the West End (See Map I:1). The West End, according to one visitor, was a working class district, while the East End held both working class and professional people. It contained, he said, the "wealth, culture, and refinement of the city" (Daily Colonist: September 11, 1892).

These distinctions are supported by the census of 1891: the East End, with a little more than half of the city's population had 72% of its clergymen, 74% of its teachers, and 90% of its doctors and lawyers. Office and shop workers made up 69% of the city's total, while "those engaged solely in government service" made up 84%. On the other hand, only 26% of the city's factory and workshop workers and 31% of its fishermen lived in the East End. (See Appendix A for a more detailed breakdown.)

Such differences in the occupational pattern clearly reflect the locations of different types of employment. For

example, the East End held the House of Assembly, and various government offices. It also held, according to the census, 33 of the city's 68 "mercantile premises", but only 13 of its 45 factories.

Since the division of the city into East and West Ends was essentially a bisection along a line perpendicular to the waterfront, it can only be concluded that the variations within the city's economic and residential patterns cannot be explained as simply as being just the results of distance from the harbour.

But, without turning to data more detailed than either the descriptive material or the census can provide, little more can be said. However, because of the complexity of the detailed data drawn from the tax rolls, atlases, and directories, it was collected only for two small areas of the city.

These areas (See Map I:1 and Maps V:3 & V:4) have been labelled, in light of their use within this thesis, the "study" and "comparison" areas. The first is a very old part of the city, stretching north from the waterfront to Military Road, and west from Cochrane Street to Prescott. It was chosen as study area because virtually all of its structures were destroyed in the Fire, and because it exhibited an interesting mix of morphological, and other, features. In contrast, the comparison area, which runs north of Military Road to the then outskirts of the city was quite new, still

suburban, and still developing. It was chosen because it was not touched by the Fire, and because it and the study area together form a complete core-to-perimeter wedge of the late nineteenth century city.

Because of the reasons for, and the method of, selection of the two areas, a few important caveats must be made. First, the failure to demonstrate radial variation in some economic or residential pattern within the study area cannot be taken to mean it did not exist in the city, while the failure to demonstrate variation with distance from the harbour can be considered as reasonably compelling, although not conclusive, evidence of its non-existence. Second, and along side of the broad limitations imposed by the first caveat, nothing demonstrated as true for the study area can be assumed to be necessarily true for the remainder of the city.

Perhaps the best place to begin this detailed examination of the study area is with the division of its land into parcels of property. Table V:1 summarizes one aspect of this division: the extent to which ownership of land was concentrated in the hands of a few, or was, conversely, "fragmented". Maps V:1 and V:2 summarize a second aspect: the division of land into freehold and leasehold properties.

These maps must be regarded as showing only very generalized patterns. Exact locations cannot be determined

TABLE V:1

PATTERNS OF TENURE: 1891

| | Street | FREEHOLD Lots | FREEHOLD Owners | LEASEHOLD Lots | LEASEHOLD Owners | TOTAL* Lots | TOTAL* Owners |
|---|---|---|---|---|---|---|---|
| COMPARISON AREA | Water | 25 | 18 | 16 | 9 | 45 | 28 |
| | Duckworth | 35 | 2 | 30 | 10 | 66 | 31 |
| | Gower | 29 | 15 | 49 | 4 | 78 | 19 |
| | Military (south-side) | 7 | 2 | 32 | 2 | 40 | 5 |
| | Prescott | 7 | 7 | 64 | 4 | 71 | 11 |
| | Cochrane | 1 | 1 | 60 | 2 | 61 | 3 |
| | Flavins | 10 | 4 | 5 | 2 | 15 | 6 |
| | Cummings | 6 | 1 | 0 | 0 | 6 | 1 |
| | Bannerman (North-South) | 0 | 0 | 42 | 2 | 42 | 2 |
| | Knight | 0 | 0 | 11 | 1 | 11 | 1 |
| | Bond (East-West) | 0 | 0 | 21 | 1 | 21 | 1 |
| | Interior Streets | 27 | 6 | 23 | 5 | 50 | 11 |
| | Pilots Hills | 10 | 5 | 8 | 1 | 18 | 6 |
| | Kings | 65 | 30 | 4 | 3 | 69 | 33 |
| | British Square | 2 | 1 | 14 | 1 | 16 | 2 |
| | Queens | 17 | 9 | 6 | 2 | 23 | 11 |
| | Colonial (South-West) | 0 | 0 | 38 | 5 | 38 | 5 |
| | College | 0 | 0 | 6 | 1 | 6 | 1 |
| | Carew | 2 | 1 | 8 | 1 | 10 | 2 |
| | Stewart | 0 | 0 | 4 | 1 | 4 | 1 |
| | Holloway (south) | 0 | 0 | 3 | 3 | 4 | 4 |
| | TOTAL AREA+ | 244 | 110 | 444 | 33 | 689 | 144 |
| STUDY AREA | Rennies Mill Road | 19 | 13 | 10 | 4 | 29 | 17 |
| | Monkstown Road | 22 | 14 | 14 | 5 | 36 | 19 |
| | Hayward | 2 | 1 | 39 | 3 | 42 | 5 |
| | Barnes & Lanes | 11 | 11 | 37 | 8 | 48 | 19 |
| | Military (north-side) | 3 | 3 | 3 | 1 | 6 | 4 |
| | Catherine | 2 | 2 | 6 | 2 | 8 | 4 |
| | Mullock (James) | 8 | 3 | 41 | 2 | 49 | 5 |
| | William | 0 | 0 | 39 | 1 | 39 | 1 |
| | Maxse-McDougall | 13 | 1 | 7 | 1 | 20 | 2 |
| | Belvidere | 0 | 0 | 14 | 1 | 14 | 1 |
| | Fleming & Lanes | 0 | 0 | 26 | 2 | 26 | 2 |
| | Circular Road | 13 | 9 | 1 | 1 | 14 | 10 |
| | TOTAL AREA+ | 94 | 60 | 240 | 17 | 335 | 78 |
| | GRAND TOTAL | 338 | 170 | 684 | 49 | 1,023 | 220 |

*Includes publicly owned parcels.
+Totals given are not the totals of figures in columns, but separately derived: this avoids double counting of certain large properties.

from the tax rolls -- the source from which the maps were compiled. In some case, boundaries between parcels of land could be approximated with some certainty from the atlas sheets or from other sources: these approximate boundaries are indicated on the maps. In other cases, even though it was possible to determine that a property of a particular tenure existed, no boundaries, other than the approximate position of its street frontage could be determined[4].

This is an especially important point to remember in looking at freehold areas. On Map V:1, very few boundaries are shown in areas marked as freehold, yet most of these contained several small parcels under diverse ownership. In contrast, the largest areas indicated as freehold on Map V:2 usually consisted of one (or, occasionally, two) properties containing large houses, and various outbuildings, such as sheds, stables, and conservatories, all set in ample grounds.

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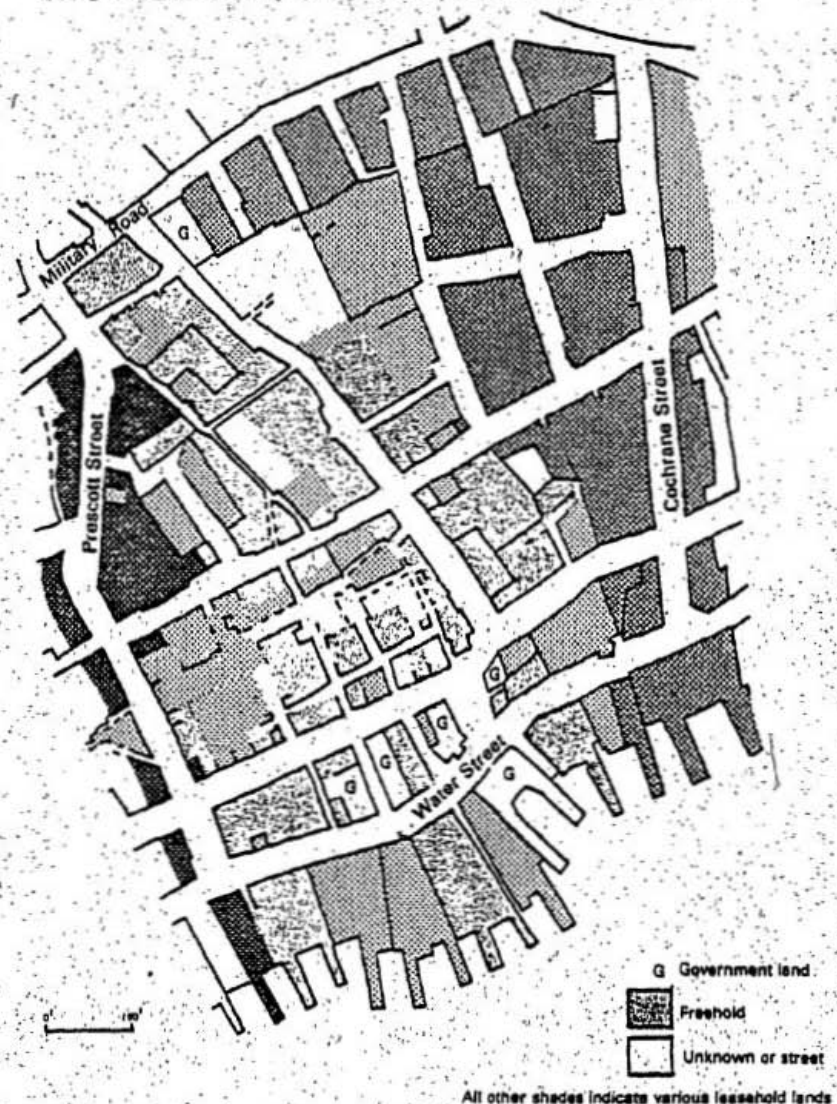
4 For this reason, it must be stressed that the locations of small properties are approximate. While everything shown has been placed as accurately as possible, it has been done in order to show the general patterns -- that, for example, there might be a patch of leasehold land in a sea of freehold, as there was on Water Street near Prescott. It has not been done in order to show that such and such a property was under leasehold in 1891. Compiling such a map would have required the collection and analysis of thousands of separate documents. This would have been an heroic task, which would not have been of any help in meeting the goals of this thesis.

Note also that it is not important, to this thesis, who owns the land. Rather, it is the pattern formed by the different ownerships.

Map V:1

## THE DIVISION OF STUDY AREA LAND INTO FREEHOLD AND LEASEHOLD PROPERTIES



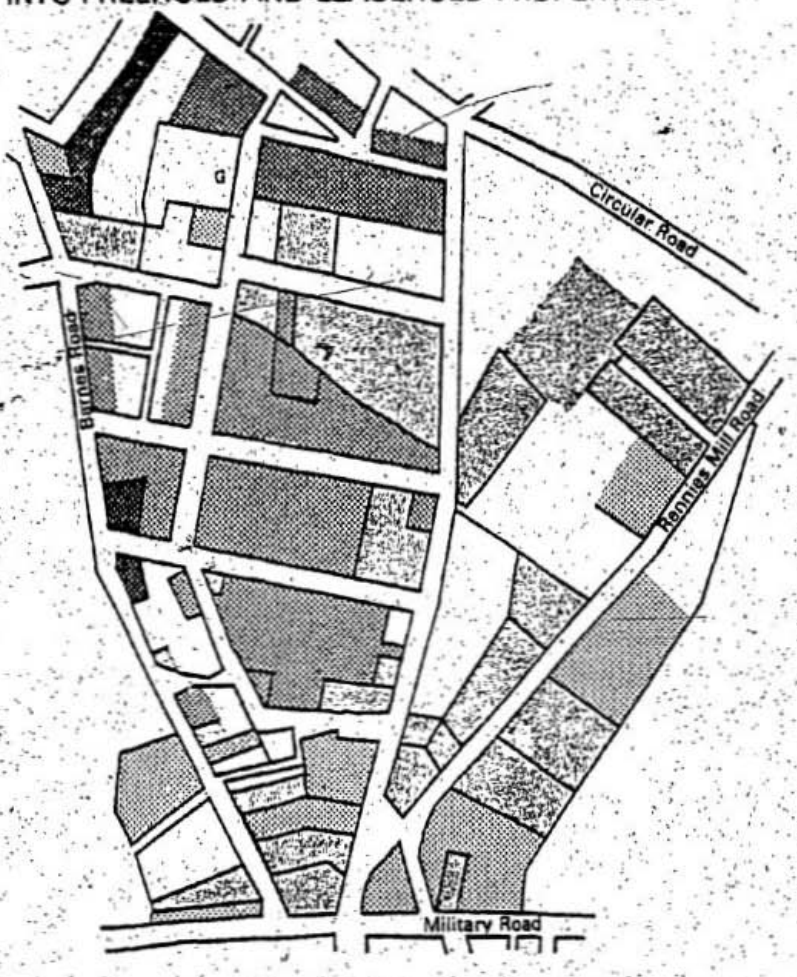
These maps can only hint at the extent to which ownership of land was fragmented, but they do show a distinct patterning of type of ownership. Map V:1 can be thought of as being divided into two quite different sorts of areas. One consisted mainly of extensive estate lands, developed under ground leases. Most of the eastern half of this map was, for example, owned by two major estates, while the property at the top of Cochrane Street was part of yet another (although one with its greatest land holdings lying outside of the study area).

Lying between these leasehold properties, and the edge of another large estate with some of its many leased holdings in the western portion of the study area, was an area with another ownership pattern. Here, while there were several parcels developed under ground leases, these were intermixed with parcels developed as freehold land. While some of the ground-leased parcels were fairly large, none were as extensive as those of the eastern half of the study area, and many were as small as two or three houselots. Furthermore, there were some parcels of land, belonging freehold to one owner, which were as large as many of the bigger ground-leased parcels in this intermixed area.

Map V:2 shows similar patterns, although less clearly: a few large land owners controlled most of the area, while other sections consisted of intermixed freehold and leasehold parcels of somewhat smaller size.

## Map V:2

## THE DIVISION OF COMPARISON AREA LAND INTO FREEHOLD AND LEASEHOLD PROPERTIES




G Government land

Freehold

Unknown or street

All other shades indicate various leasehold lands

Table V:1 shows tenure patterns not by parcels of land owned or controlled by one party, but by the number of lots into which it was divided. In this context, a "lot" can be thought of as the basic morphological unit of land-use: the ground occupied by a house, or a shop, or a merchant's premises. As an example, a piece of land under one ownership but containing four houses would be considered one parcel divided into four lots.

The figures in Table V:1 can be used to show that, in the study area, less than 25% of the land owners held, as groundlords, more than 60% of the lots. A groundlord did sometimes own only one lot; but it was more usual for him to own several. The most extreme case was the Ellis Estate (the largest of the major estates shown on the eastern half of Map V:1) which controlled at least a third of all the ground-leased lots in the study area. On average a groundlord owned about 13.4 lots (or excluding the extreme case, about eight). In contrast, owners of freehold land controlled an average of just more than two lots -- ranging from one lot per owner to the occasional group of six or seven.

A similar examination of the comparison area produces nearly identical results. Groundlords did control slightly more lots in this area than they did in the study area: less than 25% of all owners controlled, as groundlords, more than 70% of the lots. Freehold parcels contained an average of a

little less than two lots, while ground-leased parcels contained an average of about 14.1 In both cases, these are nearly the same averages as were calculated for the study area, and, as Map V:2 and Table V:1 together indicate, the range of variation was also quite large.

A number of conclusions can be drawn from this discussion. One is that tenure type, parcel size, and the number of lots per parcel were not necessarily related to each other. While it is true that freehold owners never controlled parcels as large, or numbers of lots as great, as did major groundlords like the Ellis Estate, both freeholders and groundlords could, and did, own both small and medium-sized properties.

In addition, it is apparent from Maps V:1 and V:2 that the shapes of the predominately leasehold areas and of the mixed area, along with the street patterns (which, in some cases, the tenure patterns obviously controlled[5]) strongly suggest a radial arrangement. This is presumbly the result of much earlier land divisions which created large parcels running from the harbour to the hinterlands.

The inertial effect of this initial land division appears to have been fairly strong. The significant exception is along the waterfront, where development seems to

5 While this point will not be pursued here, Buvinger contains an excellent discussion of the influence of various factors upon the street pattern. These include property lines and parcel sizes, political boundaries, and pre-existing lines of transportation (Buvinger, 1972: 21-50).

have proceeded without much concern for the type or pattern of tenure. The premises of some merchants combined properties of both types, and there is surprisingly little congruence between the boundaries of ownership and the boundaries of use. In other words, the functional use of land in these commercial areas had an impact far stronger than did its formal division.

But the ownership of the land was only half the story. Obviously, the owner of freehold land also owned any structures built upon it, while structures on leasehold land were initially owned by someone other than the groundlord. But whoever owned the structures could rent them to still another party, thereby introducing a further layer to the pattern of tenure. In fact, this was fairly common. Not only was the rental of structures one [redacted] the methods by which the Water Street merchants could "adjust" parcels of land ownership to fit the lots required for use, but about half of all housing on freehold land, and an equally significant portion on leasehold, was rented by its occupants.

On British Square, for example, where all but one of the sixteen houselots were developed under groundlease, the tax rolls list eleven leasing ground. Eight of these occupied one of the houses they owned on that ground, while another ten households were listed only as occupants, and can reasonably be assumed to have been renters. In addition, the one house on freehold land was not owned by its occupants.

Without looking at the developmental history of several of the properties of the study area, it is impossible to suggest any causal relationships between tenure patterns and (other than the street pattern) pre-Fire morphology. But looking at the insurance atlas sheets does suggest that the same line which divides the eastern area of mostly leasehold properties from the western area of intermixed leasehold and freehold ones also separates, although less precisely, two, areas with somewhat different physical characteristics.

To the east of this line, the streets were usually quite closely built, while the interiors of the blocks were generally undeveloped. To the west, although the streets may have been a little more closely built, the more striking difference is that the interiors of the blocks were often intensively developed as well. Thus, there is an obvious, if crude, correlation between the type of tenure pattern and the pattern of structural intensity.

This correlation may, certainly, be accidental, since the study area is far too small to provide a conclusive answer. Nor does the comparison area help: too much of it was undeveloped in this period, and too little of it is shown on the extant maps.

The equally "obvious" correlation between the intensity of development and proximity to the harbour is also suggested by a casual examination of the insurance maps. While even

this may be again be accidental, it is not different from what could be hypothesized from studies of other cities.

Unfortunately, no rigorous test of the strength of these correlations in the study area, let alone the rest of the city, is possible with the data available. However, dividing the study and comparison areas into a number of sub-areas permits the aggregation of some of the data in ways which can at least hint at the results required.

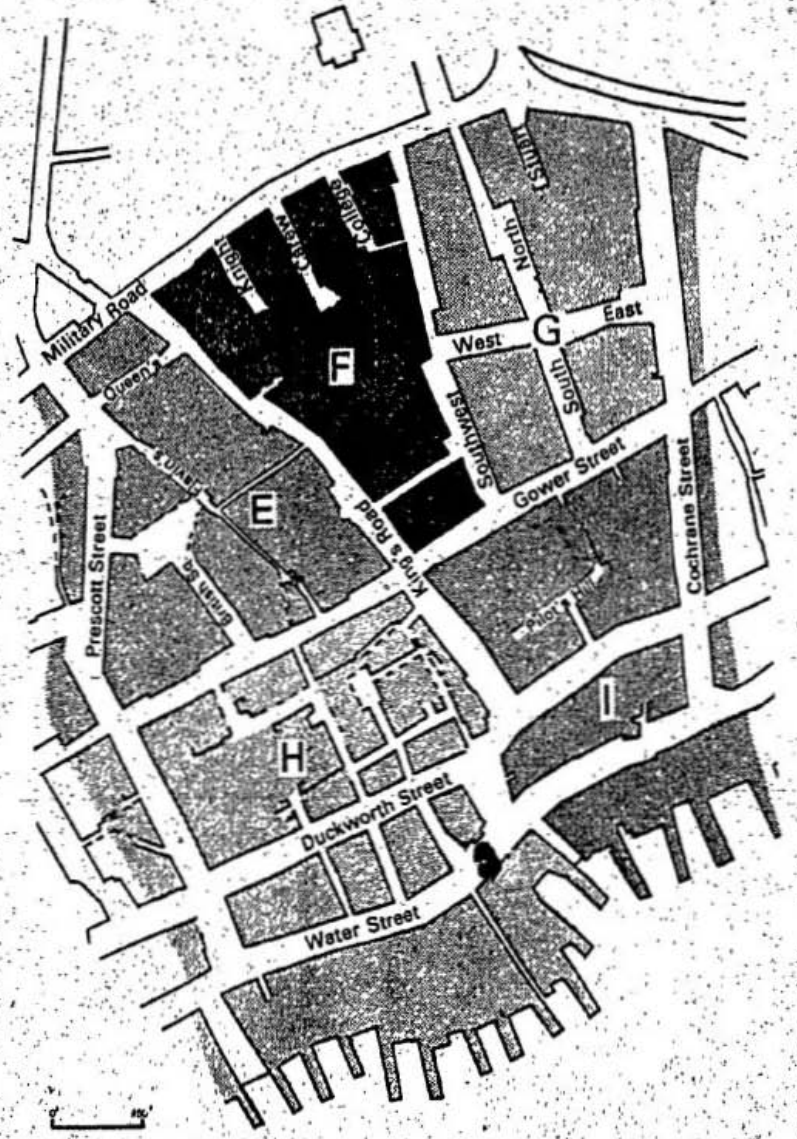
The study area was divided into five parts. These, outlined in Map V:3 are hereafter termed "sectors". The major consideration in the selection of these sectors was that they be bounded by streets whose general location and direction were not changed as part of the post-Fire rebuilding of the city. While this has some disadvantages, particularly in that, simply by the rules of their delimitation, all sectors must contain some unmodified streets[6], it does permit the direct comparison of each sector before and after the Fire, as will be done in subsequent analysis.

King's Road was chosen as the major north-south boundary. This street lies close to the line dividing the two areas of different tenure patterns, and the two areas of

6 This was a potential problem in the examination of the impact of street modifications on other variables. But, as it turned out, the problem was not too serious. The sectors did show considerable variations, with rates of modification ranging from less than 15% to a high of 57%.

Map V:3

STREETS AND SECTORS OF THE PRE-FIRE STUDY AREA



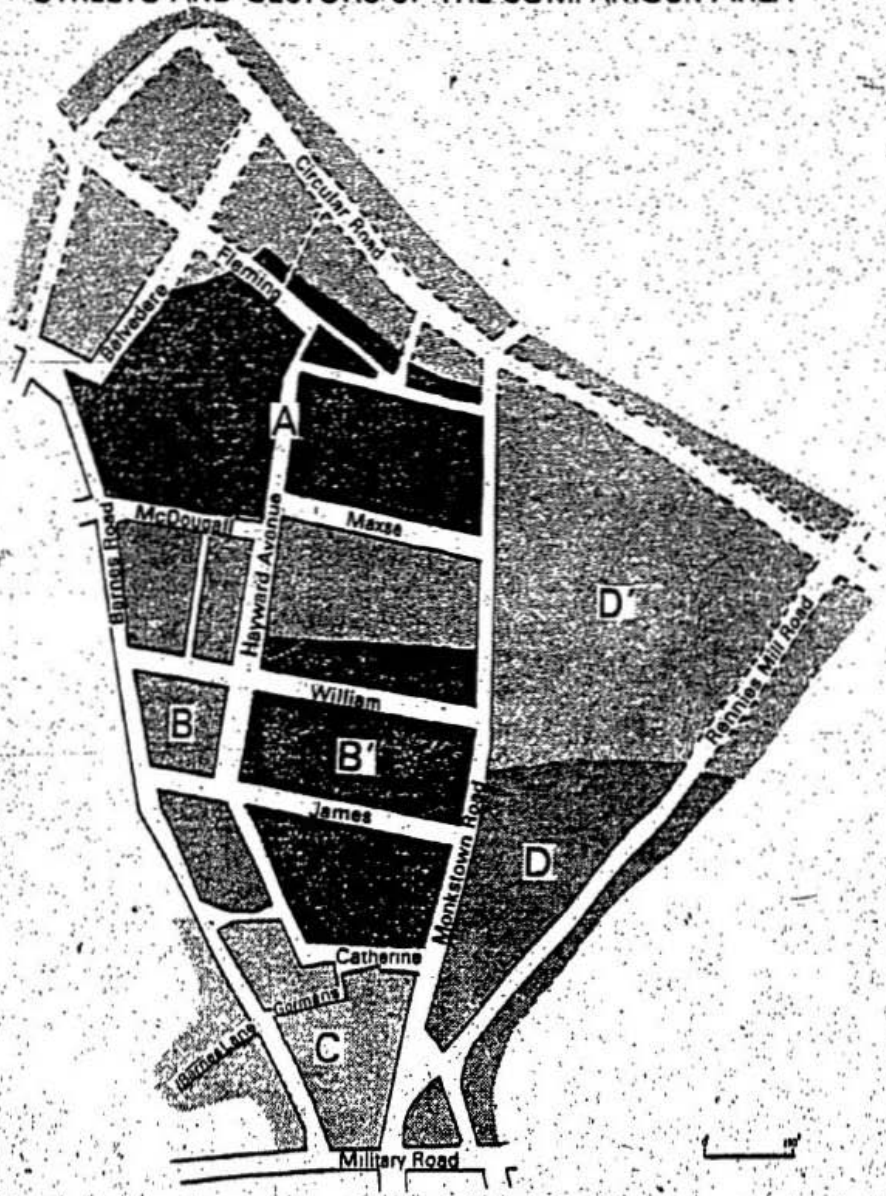
different land use patterns. Gower Street provides an east-west boundary, with the harbour and the principal commercial streets lying to its south, and an area of mixed uses lying to its north. A further division, running along what is now known as Colonial Street, separates that area (Sector G) made up almost entirely of the Ellis estate (and of small parts of two other large ones) and which was quite fully developed at the time of the Fire; from an area (Sector F) with more diverse ownership and comparatively little development.

The comparison area is divided into six sectors (see Map V:4). Two sectors were chosen largely on the basis of their present-day morphology: sector D is the one which now contains most of the largest and grandest houses of the area, and for which good cartographic evidence, for both before and after the Fire, exists. Sector D' contains another group of large houses, but no pre-Fire atlas sheets were published for it.

The area to the west of these sectors is divided into four parts. One of these, B' was defined only by the absence of its pre-Fire atlas sheet, and so, its streets, like those of sector D' can only be used in conjunction with directory and tax roll data. The remaining area was divided on the basis of differences in street patterns, differences in patterns of tenure, and, since the upper portions of this

Map V:4

STREETS AND SECTORS OF THE COMPARISON AREA



portions of this area were still undergoing the process of rural to urban conversion, differences in development.

Table V:2 presents a number of indicators of pre-Fire density, all but one derived, in various ways, from measurement of the insurance atlas sheets. Some indicators also involved counting units and sets of units from the maps.

These units are not the actual structures, but the areas of distinct, separate, and identifiable uses within the structures. This definition is chosen in consideration of the original purposes of the atlases, and of the kinds of information they present. The differences between a single large structure containing a number of side-by-side uses (for example, a terrace of three residences separated by party walls) and a contiguous set of separate structures was, one suspects, of very little importance either to the nineteenth-century firefighter or to the insurance company. For presumably this reason, the atlases do not consistently distinguish between the two, although the individual units are always indicated.

On the other hand, except in those few cases where multiple uses presented a greater than normal risk, the horizontal division of a structure into separate units (for example, into upper and lower flats) or the (sometimes less formal) division of a structure into residence and shop, seems to have been of even less importance. In any event,

TABLE V:2

INTENSITY OF PRE-FIRE LAND USE

| | Sector | Total Area (sq.ft.) | No. of Units | STRUCTURAL DENSITY (1) Average Ground Area Per Unit (sq.ft.) | Total Built-Upon Area* (sq.ft.) | (2) Density (as %) | "APPARENT DENSITY" (3) Frontage Per Unit (ft.) | No. of Contiguous Sets | (4) Average Contiguity | STREET NETWORK DENSITY Total Street Frontage (ft.) | (5) Area Per Foot Frontage (sq.ft.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COMPARISON AREA | A | 392183 | 67 | 5853.5 | 30483.8 | 7.7 | 76.1 | 32 | 2.09 | 5100 | 76.9 |
| | B | 273306 | 75 | 3644.1 | 28990.0 | 10.6 | 39.3 | 32 | 2.34 | 2950 | 92.7 |
| | C | 183315 | 50 | 3666.3 | 19256.2 | 10.5 | 50.6 | 34 | 1.47 | 2530 | 72.5 |
| | D | 283305 | 57 | 4970.3 | 25668.8 | 9.1 | 46.1 | 34 | 1.68 | 2630 | 107.7 |
| | TOTAL AREA | 1132109 | 249 | 4546.6 | 104350.0 | 9.2 | 53.0 | 132 | 1.89 | 13210 | 85.7 |
| STUDY AREA | E | 382184 | 170 | 2248.1 | 76045.0 | 19.9 | 29.6 | 51 | 3.33 | 5030 | 76.0 |
| | F | 296637 | 101 | 2937.0 | 49910.0 | 16.8 | 35.9 | 39 | 2.59 | 3630 | 81.7 |
| | G | 394405 | 174 | 2266.7 | 78875.0 | 20.0 | 25.5 | 49 | 3.55 | 4440 | 88.8 |
| | H | 614383 | 274 | 2242.3 | 195182.5 | 31.7 | 27.2 | 79 | 3.49 | 7460 | 82.4 |
| | I | 382740 | 144 | 2657.9 | 103627.5 | 27.1 | 26.9 | 42 | 3.43 | 3880 | 98.6 |
| | TOTAL AREA | 2070349 | 863 | 2399.0 | 490350.0 | 23.7 | 28.3 | 260 | 3.32 | 24440 | 84.7 |
| | GRAND TOTAL | 3202458 | 112 | 2879.9 | 592211.3 | 18.5 | 33.9 | 392 | 2.84 | 37650 | 85.1 |

*Based on sample data

Coefficients of Correlation:

| | Average Ground Area Per Unit | Density (as %) | Area Per Foot Frontage (sq.ft.) | Frontage Per Unit (ft.) | Average Contiguity |
|---|---|---|---|---|---|
| Average Ground Area Per Unit | — | | | | |
| Density (as %) | -.8009 | — | | | |
| Area Per Foot-Frontage (sq. ft.) | .1250 | .0160 | — | | |
| Frontage Per Unit (ft.) | .9250 | -.7666 | -.2318 | — | |
| Average Contiguity | -.7843 | .8622 | .0084 | -.7447 | — |

NOTE: The reader is reminded that most of the data used in this thesis are collected from completely non-randomly selected areas. Therefore, the standard tests of significance are not appropriate.

while the directory data indicates these kinds of divisions were extremely common, they are usually not indicated in the atlases.

In other words, neither structures, nor all actual units of use can be accurately counted. However, accurate counts can be made of the visible units of use (hereafter referred to only as "units"). More important, these are also the best expression of the city's morphology. It is today, as it would have been at the turn of the century, often impossible to tell from the street whether a row of contiguous houses or stores is one building or several, or whether a single building contains more than one use. Thus, by working with units, this thesis can deal with what is essentially the smallest identifiable quantity of the visible street scene. These units are used in formulating the first of the density indicators (1). This is simply the area of the sector (measured directly from the atlas) divided by the number of units.

The second indicator (2) is based on sample data. Estimates of the area covered by structures in each sector were made, using a stratified random sample of all units shown on the atlas sheets. While the details of the sampling procedure are discussed in Appendix B, two points are important enough to discuss here. First, even the measurements of the sampled units must be regarded as estimates. A slightly greater degree of accuracy could have

been achieved, but only at the cost of very greatly increased effort. Given that only the grossest differences in size can be considered important, the level of accuracy selected -- to the nearest five feet -- seems perfectly adequate.

Second, and more important, is that, strictly speaking, these data ought not to be presented by sectors, because the sample was designed to portray units as they were categorized into use-types (e.g., residential, warehousing, etc.). Where the size of a sampled population of a use-type within a sector is small, the sample for that sector and that use-type is inadequate. This is true even though the sample for that use-type over the entire study area is adequate.

As a partial corrective, wherever the size of the sample of a use-type within a sector was two or less, the average value for all sampled units in the area (study or comparison) was used instead of the average value of the sector's sampled units. In a few cases, (for example, shops and other consumer oriented uses in the comparison area) the sample size for the area was also less than two. These portions of the sample were, for the purposes of these aggregations only, replaced by a random selection of one unit from each sector.

In the context of the very coarse indicators being derived here, the presentation of the data in this way seems useful. While a small sampled population may be poorly represented, it is, after all, a very minor ingredient in the

sector's mix of uses. Nevertheless, the crudeness of the measurements and of their aggregation should be borne in mind.

The estimate of total built-upon area is divided into the total area of the sector, thus deriving the second indicator of structural density. As Table V:2 shows, these two indicators (1 and 2) are very closely related. Together, these indicators show much greater density in the study area than in the comparison area -- in fact, the densest sector of the comparison area is not as built up as the least dense sector of the study area.

Within the study area, the two sectors on the waterfront were denser than the other three. This is clearly expressed in the percent of total area which was built upon. It is less evident in the figures for average ground area per unit; however, units in this part of the study area tend to be considerably larger than those elsewhere.

In addition to the intensity of land use, the intensity of street-frontage use is considered. Two indicators were derived in an attempt to capture the apparent density of an area -- the sense of crowdedness or openness given to an observer on the street.

The first of these indicators is the average length of street-frontage per unit of use (3). (Note that this is not the average length occupied per unit, but simply the total length of street-frontage, measured from the atlas, divided

by the number of units.) This type of variable is not entirely satisfactory as, for example, an area fully developed with many large buildings could have the same average length per unit as a more sparsely developed one. It will be used for two reasons -- because it does measure a different aspect of developmental intensity than do the first set of indicators, and because it can be used in the examination of some data where the first set cannot be. (It may be easier to interpret knowing that the typical St. John's shop or residence had a frontage of about fifteen to twenty-five feet.)

The second of this pair of indicators is the average number of units per contiguous set of units (4). A contiguous set is defined as any group of buildings which touch each other, and average contiguity as the number of units divided by the number of sets.

These two indicators are, as one would expect, strongly related to each other. And, as with structural density, the same distinct differences exist between the study and comparison area. In addition, these indicators are strongly related to those of structural density: sectors with the most intense structural development did tend to have the least frontage per unit, and the more units per contiguous set.

But, if the data presented in Table V:2 suggests that the percentage of built-upon land was, in general, quite low, it does so in sharp contrast to the appearance, on the map,

of some streetscapes. In many areas, fairly narrow structures stood shoulder to shoulder, obscuring large areas of open land at their backs. Yet, most of the open land was not hidden. In the area north of Military (the comparison area), there were sizeable parcels of undeveloped land, and even on Duckworth, and on a few of the other, more minor, streets of the commercial district, there were unbuilt-upon stretches. In other words, while building land in this old and central part of the city may have been becoming scarce, it was still available.

A final indicator is the amount of area "served" by each foot of street frontage (5). This would be high where few streets served a large area, as where the interiors of the major blocks of a sector were not developed, or where most lots were very large.

But, while it is true that extensive street networks in a sector would somewhat tend to diminish structural density (by the defintions employed here), extensive street networks were also expected to be associated with greater development, and therefore with greater density. This does not turn out to be true: there is no statistical relationship between this indicator of street-network density and any indicator of either structural or apparent density.

In order to assess the possible impact of tenure patterns on these essentially morphological indicators, the data originally presented in Table V:1 are summarized in

Table V:3. This table also presents the percent of all lots which were held under lease, and an index of fragmentation. The first of these variables is self-explanatory, although it is worth noting that, because most lots in a given sector tended to be of about the same size, the number can also be considered a reasonable surrogate for the percent of a sector's area held under lease.

The index of fragmentation is simply calculated: the number of owners divided by the number of lots. However, its development and use are a bit more problematic. In some sectors, such as H, where many persons owned many small and often non-contiguous properties, there was ample opportunity for the double counting of owners, and for other errors (especially since the names of the owners are entered into the tax rolls in a fine -- and sometimes not very legible -- script).[7] Therefore, while this index is expressed as a ratio, it is perhaps better to think of it as an almost ordinal value, suggesting only higher or lower degrees of fragmentation. Its highest possible value is unity (one owner per lot), while its lowest approaches, but cannot be, zero (many lots, and few owners).

One would expect those sectors with high percentages of leasehold properties to have very low indices of

7 The problem of double counting is much less severe when, as shall subsequently be done, the data is aggregated by streets, or even smaller units.

TABLE V:3

SUMMARY OF TENURE PATTERNS: 1891

| | Sector | FREEHOLD Lots | FREEHOLD Owners | LEASEHOLD Lots | LEASEHOLD Owners | TOTAL* Lots | TOTAL* Owners | % Lots Leasehold | Index of Fragmentation |
|---|---|---|---|---|---|---|---|---|---|
| COMPARISON AREA | A | 8 | 3 | 62 | 4 | 71 | 8 | 87.3 | .11 |
| | B | 20 | 12 | 50 | 2 | 70 | 14 | 71.4 | .20 |
| | B' | 19 | 7 | 91 | 3 | 110 | 10 | 82.7 | .09 |
| | C | 11 | 11 | 24 | 8 | 35 | 19 | 68.6 | .54 |
| | D | 12 | 10 | 9 | 3 | 21 | 13 | 42.8 | .61 |
| | D' | 24 | 17 | 4 | 3 | 28 | 20 | 14.2 | .71 |
| | TOTAL AREA+ | 94 | 60 | 240 | 17 | 335 | 78 | 71.6 | .23 |
| STUDY AREA | E | 70 | 32 | 77 | 9 | 147 | 41 | 52.4 | .28 |
| | F | 27 | 9 | 57 | 5 | 85 | 15 | 67.1 | .18 |
| | G | 1 | 1 | 147 | 3 | 148 | 4 | 99.3 | .03 |
| | H | 106 | 58 | 82 | 16 | 194 | 75 | 42.3 | .39 |
| | I | 40 | 10 | 81 | 7 | 123 | 18 | 65.9 | .15 |
| | TOTAL AREA+ | 244 | 110 | 444 | 33 | 689 | 144 | 64.4 | .21 |
| | GRAND TOTAL+ | 338 | 170 | 684 | 49 | 1023 | 220 | 66.9 | .22 |

*Includes publicly owned parcels.
+Totals given are not the totals of the figures in the columns, but separately derived. This avoids double-counting of certain large properties.

Coefficient of Correlation

| | % Leasehold |
|---|---|
| Index of Fragmentation | -.8490 |

fragmentation, and those with intermixed tenure to have more moderate ones. On the whole, this is true, with the only serious exception being Sector C.

But the hypothesis that densities as an indicator of morphology ought to vary with different tenure patterns cannot be supported. As a comparison of Tables V:2 and V:3, and a look at Table V:4 demonstrate, there is little relationship between the various density indicators and the variables expressing tenure patterns. While this may be the result of the unavoidably small number of cases studied (the sectors are large enough that variations may tend to be averaged out), it does indicate that the visual "correlation" of the mapped patterns of density and tenure is more apparent than real.[8]

Density is, of course, just one aspect of urban morphology. Other aspects involve the arrangement over the city of buildings of varying, but related, form and function. Some of the character of this arrangement can be seen in an imaginary tour through the study and comparison areas.

Beginning, as would have most nineteenth century visitors, at the waterfront, the most immediate impression would be the number and complexity of structures in that

8 Maps and numbers are, of course, just different ways of presenting the same facts. Without arguing the general relative superiority of one method over the other, the author would place more faith in this thesis on the numerical presentation and analysis.

TABLE V:4

TENURE PATTERNS AND THE PRE-FIRE INTENSITY OF LAND USE

COEFFICIENTS OF CORRELATION

| | % Lots Leasehold | Index of Fragmentation |
|---|---|---|
| Average Ground Area Per Unit (sq. ft.) | .1163 | .2198 |
| Density (as %) | -.2779 | -.1971 |
| Area Per Foot Frontage (sq. ft.) | -.2005 | .1289 |
| Frontage Per Unit (ft.) | .2469 | .1168 |
| Average Contiguity | .0521 | -.5684 |

area. Between Water Street and the harbour itself, there were, according to the atlas, about 66 units, forming eleven intricately connected sets of warehouses, stores, and offices (See Table V:5.) About 30 warehouses lay between the docks and the backs of the two dozen stores and offices fronting on Water Street. These were the "open-to-the-public" facilities of the various firms controlling each dock.

On the other side of Water Street, other uses, more directly aimed at the consumer, predominated. Out of a total of 39 mapped units, there were 26 shops (including seven saloons and restaurants). Most of these were retail shops, or provided goods or services produced on the premises; a few also served wholesaling functions.

According to the directory, the harbourfront and both sides of Water Street contained 53 addresses, with 45 having at least one commercial listing. At about 21 of these addresses, the firms provided direct services to ocean-going trade; these were brokers, commission and insurance agents, wholesalers, shop owners, and fishery suppliers. At about the same number (including some of those counted above) there were firms supplying food and drink to townspeople, to visitors, and to provisioning ships. (Of these, a third appear to be mainly purveyors of strong spirits.) In addition, there were various shops, generally on the north side of the street, selling stationery, crockery, clothing

TABLE V15

A TOUR OF PRE-FIRE ST. JOHN'S - SELECTED STREETS OF THE STUDY AND COMPARISON AREAS

| Street | # of Units | Residential Only | Consumer-Oriented | Non-Consumer-Oriented | Other | # of Addresses | Residential Only | Residential and Commercial | Commercial Only | # of Households | Domestics | Clerks | Labourers | Fishermen | # of Employed Persons |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Street | 105 | 9 | 45 | 38 | 13 | 53 | 8 | 27 | 18 | 60 | 18 | 8 | 0 | 1 | 81 |
| Duckworth Street | 65 | 20 | 39 | 1 | 5 | 55 | 19 | 27 | 9 | 75 | 29 | 14 | 0 | 0 | 117 |
| Gower Street | 92 | 65 | 23 | 3 | 1 | 88 | 68 | 16 | 4 | 147 | 14 | 8 | 19 | 9 | 183 |
| Military (southside) | 36 | 32 | 2 | 1 | 1 | 38 | 33 | 4 | 1 | 42 | 20 | 3 | 0 | 0 | 61 |
| Prescott Street | 74 | 51 | 12 | 4 | 7 | 76 | 53 | 11 | 12 | 84 | 13 | 12 | 3 | 3 | 128 |
| King's Road | 76 | 60 | 10 | 2 | 4 | 75 | 54 | 20 | 1 | 125 | 7 | 8 | 28 | 13 | 159 |
| Cochrane Street | 74 | 55 | 7 | 3 | 9 | 56 | 47 | 9 | 0 | 80 | 27 | 11 | 1 | 3 | 107 |
| Sector H - off Water | 15 | 2 | 5 | 2 | 6 | 6 | 3 | 2 | 1 | 6 | 0 | 0 | 0 | 1 | 6 |
| -Other interior streets | 76 | 58 | 2 | 3 | 13 | 82 | 79 | 3 | 0 | 124 | 1 | 1 | 58 | 17 | 127 |
| Pilot's Hill | 18 | 17 | 0 | 0 | 1 | 21 | 21 | 0 | 0 | 30 | 0 | 0 | 5 | 5 | 30 |
| Flavin's Lane | 20 | 13 | 0 | 3 | 4 | 25 | 23 | 0 | 2 | 24 | 2 | 1 | 9 | 3 | 32 |
| Knight's Street | 9 | 8 | 0 | 0 | 1 | 12 | 12 | 0 | 0 | 19 | 0 | 1 | 0 | 1 | 2 |
| Cumming's Lane | 7 | 6 | 0 | 0 | 1 | 10 | 10 | 0 | 0 | 10 | 0 | 0 | 5 | 3 | 11 |
| British Square | 19 | 16 | 0 | 1 | 2 | 17 | 17 | 0 | 0 | 26 | 4 | 8 | 2 | 0 | 32 |
| East & West (Bond) | 28 | 22 | 2 | 1 | 3 | 25 | 22 | 3 | 0 | 34 | 2 | 4 | 5 | 0 | 41 |
| North & South (Bannerman) | 51 | 44 | 1 | 0 | 6 | 53 | 49 | 4 | 0 | 97 | 5 | 5 | 25 | 10 | 111 |
| Rennies Mill Road | 45 | 28 | 1 | 1 | 15 | | | | | 35 | 43 | 8 | 0 | 0 | 93 |
| Monkstown Road | 21 | 18 | 2 | 0 | 1 | | | | | 55 | 19 | 7 | 7 | 3 | 91 |
| Hayward Avenue | 33 | 24 | 1 | 0 | 8 | | | | | 70 | 1 | 4 | 13 | 9 | 72 |
| Barnes Rd & lanes | 60 | 54 | 3 | 1 | 2 | | | | | 88 | 9 | 2 | 16 | 6 | 99 |
| Maxse-McDougall | 24 | 17 | 0 | 2 | 5 | | | | | 29 | 10 | 3 | 2 | 1 | 37 |
| Fleming & lanes | 22 | 20 | 0 | 0 | 2 | | | | | 29 | 0 | 2 | 3 | 4 | 31 |
| Circular Road | — | — | — | — | — | | | | | 21 | 16 | 1 | 1 | 3 | 51 |
| Belvidere | 11 | 10 | 0 | 0 | 1 | | | | | 20 | 0 | 1 | 3 | 0 | 21 |

ATLAS DATA: The number of visible units of use and the subclassifications "Residential Only", "Consumer-Oriented Commercial" (shops, establishments offering food, drink, or lodging, and other small-scale providers of goods and services), "Non-Consumer-Oriented Commercial" (factories, warehouses, and offices), and "Other" (the residual, including stables, churches, fire halls, and unidentifiable buildings!). Note that all the last three categories could have also contained residences. Circular Road does not appear on the atlas sheets.

DIRECTORY DATA: The number of specific addresses (eg. 8 Barnes Road). This is not the same as a unit. An address could have more than one unit. Occasionally, a street has more addresses than units — this is presumably the result of different dates of the two sources. Streets of the comparison area were too poorly numbered to determine addresses. Addresses are classified as "residential only" — which should be roughly similar to the same category in the atlas data — as "residential and commercial" and as "commercial only" — distinctions not available in the atlas data.

Number of households is an author-generated grouping by similarity of names and addresses (See Appendix C).

Indicator occupations are explained in the text, number of employed persons is supplied as a reference point. The numbers in this Table probably understate the case of linked workplace and residence. There were a handful of addresses with both commercial and residential uses, but where the firm and the household were not clearly connected. These were not counted. There were also many cases where a residential listing (for such as a "tailor") did not specifically state where the work was performed. In many of these cases, it probably was done at home. Nevertheless, the address would be considered "residential only".

and other dry goods; some artisans, including shoe and harness makers; and a doctor and a dentist.

The structures in this area tended to be quite big. A typical warehouse south of Water Street would be large in ground area (2590 sq.ft.), although usually less than three stories high (with a total floor area of 5432.5 sq.ft.)[9]. In contrast, the shops on the north side of the street were taller (frequently three or more stories high) and smaller in ground area (807.5 sq.ft.). Their

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9 All size figures are based on sample data. See Appendix B.

Floor areas were calculated as ground area times height in stories (which is noted on the maps). A building with wings or additions might have more than one height given: in these all too typical cases, each wing was calculated separately. Half stories were taken literally, as this seemed a reasonable approximation of useable space. Some large structures built into slopes had different story heights noted at either end, without any apparent break in roof line: in these cases, the average height was used. A few other large structures, such a churches, had no story height given: these were treated as if they were one story buildings, as, in fact, much of their space would have been. Finally, a few buildings had open passages running through them: these passages were not included as floor area, although they had been in ground area. It is important to note that the insurance atlas sheets generally do not indicate whether or not buildings had basements. From field work, and from other soruces, it is evident that basements were common, especially in larger structures, and that they were not just used for storage. For example, in larger residences, the kitchen would typically have been in the basement. In other words, the estimates of floor area are generally low ones. Nothing can be done about this, except to note that, except for the probability that many very small buildings would not have had basements at all, the degree of under-estimation would be roughly proportionate to the size of the structure.

greater heights gave them a total floor area of 2432.5 sq.ft.

But these buildings, especially those on the north side of the street, were not exclusively commercial. In fact, despite the atlas showing only nine residences (by definition, structures used purely for residential purposes), 60 households are shown in the directory as having lived in the area. At many addresses (27), there was at least one resident who also worked at that address. At most (about 18) these were providers of food and drink, at a few (about 5), people who appear to have been important members of the mercantile class, and at most of the rest, shopkeepers and artisans. Most of those who did not work in their own residences were also shopkeepers and artisans. Other occupations included clerk, bartender, cook, engineer, foreman, letter carrier, printer, . . . and many others.

Rather than detail every job, or attempt the difficult, and probably methodologically unsound, aggregation of the approximately 2100 workers and their more than 200 different types of jobs, the four most common occupations will be discussed. These were labourers (about 12% of all workers), domestics (11%), clerks (6%), and fishermen (6%). In addition to their common occurrence, these have the benefit of social suggestiveness: domestics were most representative in upper and upper-middle class areas, clerks in middle class

areas, and labourers and fishermen in lower class ones[10].

On this basis, the residential "class" of Water Street can be shown to be upper and middle, with 18 domestics and 8 clerks (out of 81 employed persons). Lower class persons are almost non-existant (represented by no labourers and one fisherman -- and that despite the proximity of the waterfront.

One street further to the north, and still roughly paralleling the harbour, was Duckworth. Over most of its length in the study area, this street was almost as built up as Water Street (average contiguity: 3.25 units per set). But there were also several large expanses of vacant street frontage, one big enough to have held ten or twelve typically sized shops or residences.

However, if this less intense use of land was a function of the (slightly) greater distance from the harbour[11],

10 Another advantage of these four occupations is that all but "domestics" serve as tips of icebergs. Thus, where there were many fishermen, there tended also to be many seamen, mates, and fishworkers; where there were many labourers, the tendency was to also have many carpenters, coopers, and blacksmiths, while clerks tended to reside with accountants, printers, foremen, and so forth. This data, however, does not lend itself to mapping. Densities - of land coverage, population, households, etc. - varied so considerably over the studied areas that a mapped presentation would be highly misleading.

11 A cautionary note: there were also sizeable vacant areas on Water Street, outside the study area, but still close to the busiest part of the harbour. Perhaps typically, the one closest to the study area was part of an expanse of land running from the harbour (where it was used -- for the outdoor storage of lumber) to Duckworth Street.

not reflected in the size of the buildings. More of these were lower (less than three stories) than were similar shops on Water Street, but they occupied about the same ground area. There was also one major morphological difference -- Water Street's legislatively-insisted-upon use of stone or brick for bulding materials was almost unique. But beyond this, there would have been little, other than the differences in their commercial character, to distinquish Duckworth from the north side of Water Street.

Duckworth was clearly commercial, but much less so than Water Street. Forty of its 65 mapped units, and 36 of its 55 directory addresses, contained a commercial interest. Generally, these appear to have been smaller in scale, and to have served a more local clientele, than did the ones located on Water Street. (The author can only make inferences from the descriptions in the directory listings.)

As on Water Street, these commercial firms were predominantly involved in the provision of food (17 addresses: grocers, bakers, a butcher, and a restaurant) and drink (5 selling alcohol, and one manufacturing aerated waters). Remaining commercial interests included a milliner and a dressmaker, a tobacconist, a plumbing company, a laundry, and a man mysteriously described only as a "feather renovator".

Duckworth Street was also slightly more residential than Water. Nineteen of its addresses were purely residential,

and the workers at its commercial addresses were likely to live there as well. Only nine addresses were purely commercial. Along with this modest increase in residential character, there was, perhaps, an equally modest increase in "class". The four indicator occupations suggest that few of residents held lower-class jobs: there were no fishermen or labourers. The middle class, however, is better represented here than it was on Water Street, with 14 of the 117 employed persons listed as clerks, and 29 as domestics.

Climbing further up the hill brings us to the next major street. Gower, at least in its run through the study area, is quite different from the two lower streets. There were, first of all, visible changes in structure size. While the shops tended not to be much different in area than those on Water and Duckworth, residences were often much smaller: a typical one would have had a ground area of about 300 sq.ft. and a total area of about 750. Curiously, the biggest decreases in size were not in street frontages, but in depths -- a fact more "visible" on the maps of the insurance atlas than from the street. Considerably more visible would have been the relative absence of commercial uses -- only 26 of 65 mapped units, and 20 of 88 addresses, were commercial -- and the tendency of those present to be grouped on the south side of the street at major intersections.

About half of these commercial uses were grocers and butchers, but in strong contrast to the harbourfront, none

sold alcoholic drink. The rest included a dressmaker, a plumber, a cooper, a painter, and a carriagemaker.

This section of Gower Street was also of lower "class" than were Water and Duckworth. Of its 183 employed, 19 were labourers and 9, fishermen. It also had a small middle-to upper class population, indicated by 14 domestics and 8 clerks.

The gradual diminuation of commercial character that we have seen is almost complete by the time Military Road is gained. On the south side of the street, comparatively large (2 1/2 stories, and total floor areas of about 1250 sq.ft.) houses faced the undeveloped and public lands to the north. Most houses were, as they were throughout the study area, attached to their neighbours, but frequent side streets broke them into groups of only four or five.

There were very few commercial uses: of the 36 mapped units, only 3 were commercial; of the 38 addresses, only 5. At four of these addresses, food and drink were sold; at the fifth was an undertaker (most of whose facilities were on the adjacent side street.)

Not only was Military residential, its spacious houses tended to hold single families: it is the first of the streets discussed which did not have nearly twice the number of households as it did residential and residental-and-commercial addresses. Furthermore, these households appear to be of higher "class" than those of any street we have seen

so far: out of 61 employed persons, there 20 domestics (nearly one for every two households), three clerks, and no fishermen or labourers.

So far, our tour has shown a general decrease in commercial uses with greater distance from the harbour, and a concommitant increase in residential uses. Of greatest interest, however, is that even on the apparently commercial streets, there was a considerable residential component, and that most addresses with commercial uses were also residential. We have seen, nevetheless, only a few of the streets of the study area. There were also three major north-south streets, and many more minor streets.

As might be expected, the major north-south streets (Prescott, Kings, and Cochrane) tended to share the characteristics of the streets they crossed -- essentially, they became less and less commercial and more and more residential as they led away from the harbour. Cochrane Street's nine commercial uses, for example, were all south of Gower Street.

The three streets were morphologically quite distinct. King's was crooked, and quite narrow in places, with the usual groups of five or six attached houses interspersed with undeveloped areas. Prescott and the lower part of Cochrane were nearly completely built up. The upper part of Cochrane was less dense, but not just because it ran through undeveloped land. It consisted of two-unit structures, most

of which are mapped as remarkably similar in shape and size (2 1/2 stories high, with a total floor area of 1250 sq.ft.). These structures were arranged so that each was a few feet from its neighbours: of all parts of the study area, this is the one which looks the most "planned".

If Cochrane Street's morphology suggests upper or middle "class", this is supported by its indicator occupations: 27 domestics and 11 clerks out of 107 employed persons (21 and 5, respectively, of 45 in the northern section). Prescott was perhaps a little more middle "class", while King's was more like Gower Street -- lower "class" occupations were the most common.

Within the grid marked out by these major cross and north-south streets were many other streets. With few exceptions, these did not serve as through-streets; many did not even pass completely through the sectors marked out by the major grid streets. These can be thought of as "interior" streets.

Returning once again to the harbour, there were in Sector H, a group of these interior streets running north and south of Water Street. These were short, very narrow lanes, more or less commercial in character, holding a sailmaker, a baker, a carpenter, and a few residences.

A larger, and more interesting, area in Sector H lay between Duckworth, Prescott, Gower and King's. This area, labelled the "Great Mess" by the author, in references to its

morphology and the confused quality of its data, contained a maze of short, sometimes unnamed, and crooked streets, running more or less at random through the block. The area as a whole was predominantly residential: only 5 of its mapped units, and 3 of its addresses were commercial. It was also quite distinctly lower "class". Out of 127 employed, there were 58 labourers, and 17 fishermen.

Not surprisingly, the houses tended to be quite small. Ground area could be as little as 100 sq. ft., and total floor area as little as 200, although more typically, these figures were about 300 and 600. It is in this area that the tax rolls refer most frequently to tenements (not a quality judgement as such, but an indicator of multi-family housing), and the directory refers to people living in sheds.

A somewhat tidier (in terms of ground plan) and much smaller lower "class" residential area existed north of Duckworth Street in Sector I. Seventeen of the eighteen small units were houses, arranged in three long terraces, and holding 30 households. Of the 30 employed persons, there were 5 fishermen and 5 labourers, along with various marine tradespersons, including a master mariner and a mate, and a few other workers.

While the interior streets were nearly always residential -- two other examples are Knight's and Cummings -- a few were not. Flavin's Lane, running north from Gower in Sector E, was almost industrial, with a large commercial

bakery, and the electric light company. (These were, respectively, 3200 sq.ft. and 2200 sq. ft. in ground area, and 6200 and 6025 in floor area, making them among the largest buildings in the study area.) Aside from these, the lane was sparsely built up, with its houses holding, like most of the other interior streets, a generally lower "class" population.

But not all these interior streets were lower "class". British Square was as solidly middle "class" as its name might suggest. Out of 32 employed persons, it had 8 clerks and 4 domestics. British Square was also unique (in the study area at least) in that its two ranges of connected houses flanked either side of a short street leading, rather dramatically, one imagines, to a very large hall. This belonged to the British Society, which also owned the land upon which the houses stood. British Square was also the only one of the interior streets with piped-in water; it is not known whether this reflected or produced its middle-class character.

A final set of streets will be briefly considered. These are East and West (now Bond), and North and South (now Bannerman). Morphologically, the most interesting thing about them is the sudden jog in North Street, at the boundary between the Ellis and Tobin lands. Otherwise, they seem, as Table V:5 shows, to represent typical residential streets for the study area.

The tour can continue -- in less leisurely fashion -- through the comparison area. One of the two streets diverging from the intersection at the top of Prescott Street was Rennie's Mill Road. Before the Fire, this was quite suburban and quite upper "class". This was reflected in its large houses (a typical one was 2 1/2 stories over a full basement, with 1050 sq.ft. of ground area, and 2625 of total area). These were set in grounds large enough to provide some isolation, and to contain various outbuildings: conservatories, carriage houses, and the like. Interestingly enough, despite their size and the openness of their development, many of these houses were built as one of an attached pair (or occasionally, as one of a trio or quartet).

The street's status is also reflected in the indicator occupations. Out of 93 employed persons, there were 43 domestics -- and an uncounted number of cooks, butlers, and gardeners. Since there were only 35 households, it is apparent the area was well served.

While Rennie's Mill was the only street to be so thoroughly upper "class", there were parts of other streets which matched, or nearly matched, it. The eastern ends of Circular Road and Maxse Streets, and the southern ends of Monkstown and Barnes Roads were all rather toney and suburban. But on all of these streets, their "class" declined rapidly, and visibly, with distance from the harbour, and from the park and government lands to the east.

Nothing like these upper "class" street segments existed in the study area. They were, in fact, something of a new phenomenon; many of their structures were quite new, and much of their land was just undergoing development. As an 1892 newspaper ad shows, it was their suburban quality which was their appeal. The six building lots (each measuring 30 by 90 feet) fronted on Maxse Street and Monkstown Road: this was "undoubtedly the most charming site anywhere in the city, giving a magnificent view of the valley, lake, and the surrounding country" (Evening Telegram: April 11).

The rest of the area was lower or middle "class". Hayward Avenue was fairly typical -- except for its length. Development was spotty: ranges of five or six houses alternated with undeveloped parcels. The size of the structures was highly variable. Unusually small was a range of ten one-story buildings of no more than 300 sq. ft. A more typical house was 2 1/2 stories and about 1250 sq. ft. in total floor area. A probably somewhat larger house (one cannot be sure of the size since it was located in an area where the map sheet is missing) was the subject of an uncommonly descriptive advertisement. On Willian near Hayward, it would have had a fairly typical room arrangement for a 2 1/2 or 3 story house (note: the second "flat" is the first story).

> basement kitchen (water in); second flat contains parlor and dining room; third flat, two bedrooms; fourth flat, three bedrooms; all of which are thoroughly plastered, light and airy, with a full view of Quidi Vidi lake and the surrounding country; flower garden and outhouse in rear.
> (Evening Telegram: April 7, 1892)

Needless to say, the area was not without commercial uses, even on Rennie's Mill Road. There were a number of small stores selling food, although these were less common than they were in the study area. In addition, there were a large commercial farm, an oil clothing factory and its warehouse, a large builder's yard, a limekiln, and the municipal stables. These were all the sorts of uses which could have been predicted, from the literature on other cities and from the model presented earlier, to have been located here at the very edges of the city.

Our tour of the study and comparison areas has, in fact, shown it to have many "predictable" characteristics. These areas were parts of a "walking" city, or in the terms of this thesis, a "small" city. Very clearly, it was far from exceeding its "ideal" size, as could be seen from the amount of centrally located, and still available, land for development.

Yet the study area was beginning to develop densely near the waterfront, and to show the results of the process by which forms could be adopted to changing functions: without

doubt, the complexity of the warehouse development along the waterfront shows this best.

The areas examined were also beginning to show a certain amount of functional separation, with, as predicted, the activities of the harbour serving as the organizing focus. Non-consumer-oriented commercial uses were almost entirely harbour-side ones; consumer-oriented ones were more widely spread, but also tended to be more common closest to the harbour. But many kinds of commercial uses could be found all over the study and comparison areas: this was true not just of the ubiquitous sellers of food and drink, but also of various artisans, and even of factories and warehouses.

Residential uses also existed throughout these areas, even in the commercial core. Very many worked and lived in the same buildings, making the shortest of all possible journeys-to-work. Others lived farther away: there were the beginnings of a rich, new, suburb, and of a less prosperous one. Even here, distance from the harbour seems to have exerted its influence, although this may have been somewhat tempered by the influence of distance from the geographical centre of political power, or from the city's largest and most elegant park. As we have seen, the status of various suburban streets and parts of streets fell away with distance from all of these.

The same influences may explain the status of the major

streets of the study area. Of the four, "class" was lowest on the street more or less equidistant from the harbour, and from the government buildings and park lands. But the lowest "class" of all was in the interior streets, where, if poverty did not mean living in the extremes of squallor found in "large" cities, housing was of definite inferiority.

The arrangement of structures on the land followed typical patterns. Of special interest is the frequency, even in new and upper class areas, of attached houses as the common method of development.

Finally, the analysis presented above has cast considerable doubt on the permanent influence which tenure patterns might be expected to have on morphology. Neither in terms of various measures of intensity of land use, or in the arrangement of economic uses or social "classes" over the study and comparison areas was there any important relationship with the type or the fragmentation of ownership. How much effect these might have had on the process of rebuilding remains to be seen.

## VI. THE CITY DESTROYED: THE GREAT FIRE OF 1892

The fire-fiend rushes, roaring, irrepresible in
might,
Swept boulevards, and soaring, shrouds high fanes
in livid light.
Nought but desolation, by the rising sun is seen;
The direst devastation, where was joy but yester
e'en.

Homeless thousands gazing, on the ruin where their
all
Moulders, fitfull blazing, thro' that black and
murky pall.
See but "In Memoriams"; of the fire-fiend at whose
nod,
Razed were tall emporiums, and the temples of their
God!

Eros Wayback, "The St. John's Fire of July, '92" (1892)

By 1892, some would have thought the city safer from fire than ever before. Nearly fifty years had passed since the last major conflagration, after which, in the commercial areas, colonial law had required brick and stone buildings, and streets wide enough to serve as firebreaks. Furthermore, the city had a new water system, with most areas having an apparently abundant supply. In 1883, the Reverend Moses Harvey, who also served the city as journalist, historian -- and booster -- had declared that "now St. John's is as secure against fire as any other city of the New World" (Hatton and Harvey, 1883: 92).

Harvey was perhaps a little too optimistic. A more realistic report, although admittedly one made with the benefit of hindsight, listed the city's fire-fighting capabilities:

> Fire department: one steam fire engine, weighing 5,600 lbs.; capacity only two hundred and fifty gallons per minute; requires ten minutes to get up full steam; two worn-out hand engines, one of which is on Southside, with about two hundred and fifty feet of old leather hose, and a few lengths of ladders; three old extension ladders, seven hand hose reels, seven sleds, about 2,000 feet of cotton hose (1,000 feet ordered from England), one old coal-supply hand waggon, eight men paid full time. Annual expenses, about $7,000. No life-saving appliances.
>
> Water supply system, gravity; pressure, twenty to one hundred pounds, but when full supply is on there is no pressure in the higher parts of the city.
>
> (Journal of the House of Assembly, 1893: 270)

As it happened, the water system, at Rawlins Cross, one of "the higher parts", was being repaired on the eighth of July, 1892. That afternoon, a fire, which was not to be extinguished until almost the entire East End of St. John's had been destroyed, began. By the next day, several acres, containing the homes of about 11,000 people, the city's principal public buildings, and the better part of its commercial area, had been burnt, leaving only a vista of charred foundations and tottering chimneys.

Like the "Great Fires" that had destroyed so many cities, this one had had almost trivial origins. It had started, at milking time, in Timothy Brine's stable at Long's Hill and Freshwater Road -- a suburban area to the west of the city. Some said it was caused by the careless smoking of a stable hand, others that it was the "Wilful act of the man Fitzpatrick, now on trial for cutting the tongues of Brine's

horses" (Prowse, Moses Harvey Scrapbook[1], 22).

At first, the Fire caused little alarm, but circumstances conspired to create a catastrophe. The city had had no rain for a month, and a gale of wind was blowing from the west (Harvey, Scrapbook, 1). Worst of all, the repairs to the water system had left the pressure so low that the firemen had trouble operating their hoses (Telegram, Scrapbook, 18).

The wooden houses, with their dry roofs, caught quickly, while not even the brick and stone buildings of Water and Duckworth Streets were spared. Most of these had, by this time, wooden extensions at their rears, and, in any case, the heat of the Fire was so intense that their interiors and contents soon ignited (Scrapbook, 4).

Ten hours later (See MapI:1), the only buildings intact below Military Road were a stone bank building -- with fireproof steel shutters -- on Duckworth Street, a row of houses along Military, and five or six wooden tenements just below it (Scrapbook, 8). Estimates of the damage varied:

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1 Moses Harvey kept a number of scrapbooks, including one with a section devoted to the Fire, and to its aftermath. This is now in the Provincial Archives, and provides one of the most complete single sources of information about the Fire. It consists largely of newspaper clippings, many of which are Harvey's own writing for local and foreign papers. Unfortunately, Harvey was quite lax in identifying the authors, dates, or origins of the clippings. Some of these unidentified clippings are used in this thesis; these will henceforward be cited as "Scrapbook", followed by the page number. However, fuller information will be given where possible.

insurance payments were thought to total about $4,850,000, the actual loss about $15,000,000 (Telegram, Scrapbook, 18). Reports of the number of homeless ranged from 11,000 to an obviously inflated 20,000. A fairly conservative set of figures put the number of houses destroyed at 1300, and the number of families left homeless at 1900[2] (Harvey, New York Tribune, Scrapbook, 5). The economic and social fabric of the city had been seriously damaged as well: the government later listed the loss as

> The Courts of Justice, Custom House, one Cathedral, three Churches, five Public Schools, ten Public Halls, and Athenaeum, together with some three thousand dwelling houses and stores having been totally destroyed.
> (Journal of the Legislative Council: August 11, 1892)

Factories, banks, offices, docks, and warehouses had been destroyed as well.

The most immediate problems were, of course, the feeding and housing of the dispossessed. Camps were set up in several parts of the city, housing perhaps 1,500 people. But most people -- about 6,000 -- apparently took refuge in the

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2. If the figures are correct, they indicate that the burnt area was a good deal more crowded than the city as a whole -- and also that it had larger families. Using the 11,000 homeless figure this source gives, the area had an average number of persons per house of 8.5 (compared to 6.4 for the city and suburbs), an average number of families per house of 1.5 (compared to 1.3), and an average family size of 5.8 (compared to 5.1). Given what we know of the study and comparison area from the information presented in the previous chapter, these figures for the burnt area do seem reasonable.

homes of friends and relatives in other parts of the city, or -- as did an unknown number -- left the city altogether (Evening Herald: September 13, 1892). A relief committee was set up, to administer aid and to distribute the gifts sent from abroad. Their work included the provision of temporary housing, and of food, blankets, and clothing. Craftspeople were helped to replace their tools, and some, who could prove they had jobs waiting for them in Canada or the United States, had their passages paid (Fire Relief Committee, 1894: 11).

The Rebuilding of the City

Attending to the immediate needs of the dispossessed was relatively easy. But before rebuilding could begin, solutions had to be found for a number of more difficult problems, created, or at least brought to the surface, by the Fire. There was, first of all, some dispute over whether it was the city council or the colonial government which had the authority to designate new street and property lines, and to expropriate and make compensation for, affected properties. Second, there were difficulties involving leasehold properties. It was popularly feared that, if the leases on these were to be renegotiated, the landlords would be able to turn the Fire to their own advantage by charging extortionately high new rents.

Finding the solutions to these problems, particularly to the first, was to be complicated by the political situation of the city. While it had been given a limited form of municipal government four years earlier, there were still several unresolved issues, including the city's authority to collect taxes, and to take and pay for land.

That these issues remained unresolved was largely the result of the tangled relationships between the government and the council. The first council, taking office in 1888, had had two elected members opposed to the government, and five supporting it. Two of these five were, as prescribed by the Municipal Act, government appointees. With its clear government majority, this council met very well the colonial government's original plan of a subservient city council.

But, in the general election of 1889, the incumbents lost, leaving a Tory council and a Liberal government at loggerheads. One of the appointed councillors was bribed away with a place in the government; the other was more resistant. Eventually, even he was forced out, on the grounds of corruption, and thus the Liberals gained a one seat majority.

They retained this slim majority in the 1892 council election, only to have one of <u>their</u> appointees nominated as chairman by the Tories. The gentleman won -- having voted for himself -- and thereater usually sided with the Tories (Baker, 1976: 25).

Meanwhile, the Liberals had tried to amend the original Municipal Act. The legislation was poorly drafted, giving, in one instance, both branches of the government the right to collect taxes without allowing for the consent of the Governor (Baker, 1975: 90). The indirect effect of this unconstitutionality was that the city was virtually penniless, having gone without any major source of revenue for two years (Evening Herald: September 22, 1892). In another instance the government, in altering the legislation pertaining to land expropriations, had given itself control over the setting of costs, but not the power to actually take the land (Evening Herald: September 12, 1892).

As a result, the city, which had neither clear authority, nor the financial means, to plan for rebuilding, had to depend on the good graces of the government. But the government had no compelling reason to co-operate. For some of its members, the fate of the city was of little concern: their economic and political interests lay in the rural districts of the colony, and in their primary resources. For some others, whose power bases had been threatened by the city's growth, by its nascent political independence -- or by its newly franchised (and mostly lower class) voters -- its depopulation, stagnation, or decline were not disagreeable to contemplate.

Furthermore, the rebuilding would provide an unparalleled opportunity for patronage, an opportunity the

government would not have wanted to fall into the laps of a council controlled by its opposition (Baker, 1976: 26). And, quite aside from the political gains to made, there were also personal financial ones. Such, at least, was frequently suggested by the opposition press -- and it can, in fact, be seen from the tax rolls that many of the properties in the burnt-out area were owned by prominent people, including the incumbent Prime Minister. Another group of prominent people, again including the Prime Minister, managed leasehold properties in the area for absentee landlords (Baker, 1975: 124).

In the event, when, immediately after the Fire, the council approached the government, proposing a policy of co-operation, it apparently agreed. But, on the twenty-fourth of July, when the council presented its rebuilding plans to the government, they were rejected. According to the Herald (which is clearly not the most unbiased of sources), the government "tinkered" for a few weeks,

> and then disclaimed any authority in the matter. They followed up this disclaimer by a mean attempt to discredit Council, and the Surveyor General's department gave the following advice to those inquiring when the street lines would be defined: 'Make immediate application to the Chairman of Municipal Council in writing for the street lines, and if you do not get it within six days, build on the existing street line.' Shortly afterwards they wrote a note to the Council not to give any street lines until the legislature had met and enacted measures concerning the matter . . . .
> (Evening Herald: September 12, 1892)

If the city was discredited by any such "mean attempt", it might also have been embarrassed by its own advertisement, which promised street lines "in a few days", and which ran unchanged from mid-July to the end of August (Royal Gazette).

In the meantime, the government had accepted an uninvited offer of help from the War Office for forty Royal Engineers and three officers, based in Halifax (Carter, Letter of August 16, 1892). The Engineers arrived, did some surveying, and left without finishing, being replaced by a local crew (Evening Herald, September 14, 1892). Despite the need for legislation, the re-opening of the House, which had originally been scheduled for July 21, was postponed to August 11. Two weeks later, the government, having taken matters into its own hands, passed a pair of acts, which, among other things, retracted any authority the council might have had to plan the rebuilding of the city.

The first of these acts (Cap I, Vic 56) also required that all plans for new buildings in the burnt area be approved by the Surveyor General and established procedures for arbitration and compensation where street realignments would affect properties or property values. It also described plans for the reconstruction of the burnt area's streets, providing specifically for the widening and straightening of most of the major streets, and by reference to earlier legislation, for the widening of others.

How much thought went into the plans may now be impossible to determine. Whatever work the council may have done was ignored, as may also have been the work of the Royal Engineers. In only one instance do the rather sketchy reports of the Legislature's deliberations show any serious disagreement. This arose over the suggestion of a new street in the congested area to the north of Gower Street. While the Surveyor General felt the area had enough streets already, the House did not agree (Royal Gazette: August 22, 1892).

The act, as finally passed, was hardly a radical one. Much of it was based on earlier legislation, which had originally been prepared shortly after the last Great Fire in 1846, and extended, through various acts, into the 1890's. In fact, only the month before the 1892 Fire, the Legislature had passed a comprehensive "Act to Consolidate, with Amendments, the Acts relating to the St. John's Municipal Council, and the Municipal Affairs of the Town of St. John's" (Cap IV, Vic 55) which more or less repeated verbatim the clauses of the 1852 "Act to consolidate and amend the Saint John's Rebuilding Acts" (Cap IV, Vic 15). Many of the sections of these acts, such as those stipulating acceptable building materials, street widths, fire breaks, and so forth, were adopted into the post-Fire act. Since, in most cases, these sections called for improvements to be made only as opportunity arose, rather than by the deliberate destruction

of existing streets and buildings, it would seem that the improvements called for would have applied, even without passage of the new act.

The second act (Cap II, Vic 56), dealing with ground leases, was no more radical than the first. In what may have been an attempt to encourage longer leases, this act required that upon the expiration of any future lease (or such a lease plus a renegotiated one) with a total term of less than 99 years, the lessee would be compensated for any improvements he had made. Since groundlords would have generally preferred shorter leases to longer, and lessees longer to shorter, this act may have been seen as a modest concession to the lessee. Certainly, the local representative of the Colonial Office thought so. He informed the office that he had accepted the act because it was so urgently needed

> as many persons were desirous as tenants of rebuilding before the present season was farther advanced, who were not willing to make the necessary expenditure on so short a term as had heretofore usually been granted by Proprietors of the Land.
> (Carter, Letter of August 30, 1892)

However, despite its appearances, the act may have done little more than reinforce the status quo. The basic system of ground leases was left in place, while the encouragement -- if it may be called that -- of 99 year leases only reflected an already existing trend toward longer leases. Nevertheless (and in the absence of further evidence, one can only speculate on this point), if the act did have the effect

of weakening the groundlord's hand, rents lower than they might otherwise have been may have been negotiated.

The press, in spite of its initial outcry on the entire question of groundleases, had almost nothing to say about this act. This was hardly true of its response to the first of the two pieces of legislation.

As could be expected, the opposition press was very critical. Most of its venom was aimed at the process by which the new plan had been approved, and on the plan itself:

> The folly of attempting to straighten the streets, and lay down new ones, without examination of the localities or topography of the ground thus to be dealt with, is becoming every day more apparent. The modus operendi by which our wiseacres arrived at the present muddle was as follows: A plan of the town was made, showing the burnt district and the streets through it. A craze pervaded the Assembly for straight lines, and without questioning the reasons why the streets were crooked in certain places, or why there were lanes here and no lanes there, they one and all with pencil and rule straightened out Water Street, Duckworth, Gower and every other street that they could mark straight on paper. They closed up lanes, opened wide streets where it is almost impossible to make them, destroyed building lots, making square pieces of building ground into triangles and all other shapes, completely destroying their frontages, and in many cases, closing all access to them.
>
> (Evening Herald: September 23, 1892)

In addition, the paper claimed, insufficient attention had been paid to the existing water and sewage pipes, and these would have to be relocated, at great expense.

The governor was no better pleased. In a letter to the Colonial Office, he complained

> that instead of taking advantage of this disaster to redesign the town on an improved plan in view of the existing drainage, and modern sanitary requirements, also to the improvement of the present steep gradients, a craze for American straight streets seems to have seized on the legislature, the so called improvements . . . . will in my opinion not only be a needless waste of urgently wanted money but will be a hardship on many and a benefit to none.
>
> (O'Brien, Letter of October 17, 1892)

At least part of the criticism was justified. Some of the less fortunate results of the plan included the widening of Flavin's lane, for example, from a narrow access lane to a proper street, thereby cutting off the back lots of houses on Prescott Street, and leaving an expanse of (still) poorly utilized street frontage on Flavin. In other instances, the widening and straightening did leave lots of peculiar shape or very small size, or lots where the re-use of old foundations, or of foundation holes, was made especially difficult.

But the new plan did have a number of effects which could be more positively regarded. One of these was the elimination of some of the lanes where the smallest and meanest houses had been located. Whether or not the intent of the Assembly in this regard was altogether altrustic is debatable. No great concern seems to have been expressed as to where the erstwhile, and presumably very poor, inhabitants of those streets were to find housing they could afford except in slums. But to many nineteenth century eyes, as to still too many twentieth century ones, removing the symptom was tantamount to removing the problem.

Be that as it may, the changes in this area were not minor. Probably one of the best examples of this type of modification, and one which will be of special interest in this thesis, is to be found in the district between King's Road and Prescott Street, where an especially dense maze of alleys was partially removed.

The new street pattern also provided much more direct access from the top of the hill to the harbour. Here, streets were widened and straightened, while the steeper ones were, not withstanding the governor's complaints, regraded as well. Another modification was the connection of a number of small disjointed streets into a few longer ones. Bond Street, within the study area, was created out of such fragments, forming an additional, probably very much needed, "crosstown" route. Finally, in the elimination of many of the irregularities of street width and direction, there must have been some intention of providing greater safety from fire[3], and some relief from traffic problems.

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3 Although the author was unable to find any evidence of this in St. John's, there is evidence, reported in Weaver and de Lottinville's work on great Canadian conflagrations (1981), that insurance companies often put a great deal of pressure on local governments to widen and straighten streets, and to require less flammable buildings, after such Great Fires. St. John's had plenty of insurance agencies in 1890: the directory lists 21. Most of these were located in the East End, and so themselves would have been burnt out.

Whatever the merits of the new plan, the passage of the Acts meant that permanent rebuilding could begin in earnest. Already, a considerable number of temporary structures had been put up and occupied. This was apparently particularly true on Water Street, where the merchants had had sufficient insurance that they were able to rebuild quickly. Many businesses, however, had moved, either temporarily or permanently to other parts of the city. Immediately after the Fire, a hastily distributed broadsheet listed several firms which had relocated to the relatively new area of the East End above Military Road (Fire Fly, 1892). But by August, Harvey was able to note that enough businesses had moved to the West End to form a commercial concentration there (Scrapbook: 5).

By August, too,

> scores of miserable wooden shanties [had] been erected amid the ruins, making their appearance, if possible, more dismal than ever.
> (Scrapbook: 6)

The situation was not much different on the eighth of September, two months after the Fire, and two weeks after the passage of the rebuilding act.

> The burnt area [was] now dotted all over with mean-looking wooden hovels, hastily run up for temporary shelter in view of the approaching winter, with here and there a permanent dwelling of fair dimensions.
> (Scrapbook: 26)

On September 12, it was reported that there were but four permanent buildings under construction on the burnt section

of Water Street (Evening Herald), while a report a few days later estimated that about 400 houses had been started in the entire area of devastation (Evening Herald: September 21, 1892). Temporary construction continued: one of the larger projects was the re-erection of a 60 by 100 foot iron building which had most recently served as a temporary church in Tottenham Court Road, London (Evening Herald: September 21, 1892).

In another two months, there were about 230 temporary buildings, and about 570 permanent ones, either finished or under construction (Evening Herald: November 12, 1892). Smaller buildings, such as houses, could be erected fairly quickly, and work on this type of construction seems to have continued over the long Newfoundland winter.

Indeed, relief aimed at the provision of permanent housing does not appear to have been offered until the winter was well advanced. There had been an early call for tenders for such housing -- 50 three-room "homes for the homeless" (Royal Gazette: August 10, 1892). But the attempt was quickly abandoned, reportedly due to difficulties in negotiations with the holder of the lease on the property where it was intended the houses should be built (Royal Gazette: August 20, 1892). Then, in December, when "many persons in town, some of them fire-sufferers, were erecting or about to erect permanent buildings of the smaller class", the Relief Committee decided to provide financial assistance

and lumber to any builder who would house, free of rent, for one year, some of the refugees still sheltered in the parks (Fire Relief Committee, 1894: 13).

Altogether, over the course of the next year, the Committee would provide lumber for use in 1,037 houses, containing 1,540 "tenements". In February of 1893, it was reported, by an observer from New Brunswick, that the committee had "given materials, in whole or in part, for about 800 new buildings, and a large number of wooden buildings of a cheap class are being erected" (Jack, St. John Telegram: February 8, 1893).

But, this observer continued, the construction of "more substantial buildings" was postponed until spring. He indicated the delay was due to the still-burning question of ground rents, and to the cost and process of negotiating compensation for land taken in the street widening and straightening (Jack, St. John Telegram: February 8, 1893).

From the scanty documentary data available, the problem of compensation seems to have been the greater. The government had to make uncountable small negotiations with land owners all over the city. An example of this is the arbitration on land on Military Road. The government took a

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4 "Tenements" in this context was probably used to signify what one might now call a flat or an apartment, and not to suggest inadequate housing or slum conditions. Note also that if the estimate of 1,300 houses destroyed is correct, the Relief Committee must have given assistance to nearly anyone who asked.

rectangular piece, 54.6 by 6 feet, and gave a triangular one, 57 by 6, plus compensation of $50, but this settlement was not offered until July of 1893 (Pinsent Collection: P4/7, Item 2).

However, in spite of such problems, most of the rebuilding seems to have been completed by the end of 1893. The tax rolls for the year show most properties, at least on the major streets, to have been re-occupied, and only occasionally is the remark "not finished" made. Some refugees were still in tents and sheds, but the Relief Committee was able to report that others were "tolerably well housed", while the rest were expected to "be disposed of" by that spring or summer (Fire Relief Committee, 1894: 13-14).

Most of the major buildings had also been reconstructed. Even quite large ones could be built in little more than a year, once land claims had been settled. An example is the Total Abstinence Hall (outside the area studied, on Duckworth, near Henry) which stood three stories high, had a frontage of 106 feet and a depth of 56, and cost in the neighbourhood of $31,000. This was built between the spring of 1893 and the end of 1894 (Total Abstinence, 1908: 59-64).

It is, of course, impossible to put an exact date to the completion of the rebuilding process. Some structures were still being replaced in 1894 (Harvey, 1894), while others were never replaced. Clearly, the process was one of ever-diminishing intensity.

One can get some sense of this decreasing intensity by looking at the Customs returns for the colony, as most building materials had to be imported. As Table VI:1 shows, many of these imports increased dramatically in 1892 and 1893, but more or less returned to post-Fire levels by 1894. Thus, it seems likely that most building materials had been brought in, although perhaps not yet used, by the end of 1893.

There is, finally, one additional reason to consider 1894 the nominal end of rebuilding. That is the almost complete financial collapse which occurred at the end of 1894, precipitating a commercial crisis -- indeed, the virtual bankruptcy of the country -- and which was to continue for most of the next year.

Whether or not the rebuilding had proceeded as far as it might have without the crisis, the crisis would have brought it to a halt. But there is evidence, of an admittedly indirect sort, that little remained to be done. There are many contemporary reports on the crisis, and these are full of heart-rending tales. Harvey's, for example, dwells on ruined share-holders, long-established but now failing firms, deserted stores and shops, closed workshops and factories (Harvey, 1897: 141). The Fire is usually mentioned, but seldom discussed; there are, strikingly, no reports of still displaced families, or of firms not yet re-opened. The Fire, and the process of rebuilding, had already become a part of the city's long and troubled history.

TABLE VI:1

IMPORTS OF SELECTED MATERIALS - 1890-1895*

| | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 |
|---|---|---|---|---|---|---|
| Rough Lumber (Million feet) | 2592.5 | 1553.0 | 9599.0 | 10383.0 | 2431.0 | 305.0 |
| Dressed Lumber (Million feet) | 526.5 | 249.0 | 3265.0 | 4569.0 | 609.0 | 49.5 |
| Timber (Tons) | 534 | 670 | 2740 | 2184 | 339 | 550 |
| Brick ($) | 4112 | 2972 | 13979 | 44075 | 11447 | 1923 |
| Cement ($) | 1558 | 4882 | 4353 | 18883 | 6395 | 1570 |
| Iron ($) | 29057 | 27001 | 24539 | 67271 | 26749 | 16899 |

*Calendar years.

Source: Customs Returns.

## VII. THE CITY AFTER THE FIRE: 1892-1895

> The vast area of charred and blackened desolation which at that time marked the former site of the principal portion of the city has given place to some six hundred houses of greatly improved architecture. . . . We can now confidently look forward to seeing St. John's restored to its former proportions.
>
> Gov. T. O'Brien, March 10, 1893

By 1894, a visitor could see the results of the rebuilding -- the new commercial blocks along Water Street, the improvements to Duckworth, and the new residences climbing up the steep hill above the harbour. But, even though the period of rebuilding was almost over, much work had not yet been done. The Church of England Cathedral was still in ruins; the Athenaeum, with its library and music room, was still in temporary quarters; and St. Andrew's new church was under construction on the old site of the Masonic Temple. Plans had been made for the construction of the Savings Bank on the church's old site, and for the construction of the new Masonic Temple on a site just above the bank (Harvey, 1894: 248-55[1]).

Our visitor may have had more immediate concerns, as only a few of the major hotels were finished. These were, however, expected to be finished shortly, as was an improved sewage system. The water supply had already been restored,

1 As it happened, these relocations did not occur as Harvey reports them to have been planned.

and the Fire Brigade refurbished (Harvey, 1894: 248-55). Even the Elictric Company had been rebuilt (Telegram: Sept. 28, 1892). Indeed, the only "modern" urban features still lacking were a streetcar system, now not to be built until the turn of the century (Lavallee, 1972: 75), and paved streets (McGrath, 1899: 12).

A comparison of contemporary descriptions can only give a hint as to the ways in which the post-Fire city differed from what it replaced. The task is made more difficult by the scarcity of work about the rebuilt city. But this may, in itself, be a clue: if nothing much had changed, there would have been very little reason to publish new or different descriptions, had they been travel guides or newspaper reports.

In fact, most of the few new post-Fire descriptions are remarkably similar to the pre-Fire ones. This is particularly striking when comparisons can be made between the pre- and post-Fire work of a single author. The best examples, since he is by far the most reliable of these writers, are Harvey's descriptions. In his 1894 work, he does make comparisons: the new part "is considerably improved", some of the new buildings "are a great advance on those destroyed." (Harvey, 1894: 249). Nevertheless, many of his passages are very similar to, and some even exact replicas of, ones first seen in his earlier work.

This becomes more significant in light of Harvey's character, and of his position in the community. He may have been a booster of the first rank, and he was often overly

character, and of his position in the community. He may have been a booster of the first rank, and he was often overly optimistic. But he was neither lazy enough, nor dishonest enough, to re-use passages which were no longer true, especially if they were sometimes unflattering to the city he so dearly loved.

Another description, by an author who apparently had not published one of the pre-Fire city, was given in a series on the "Capitals of Greater Britain" in 1899. After mentioning the tiered arrangement of the town on the hills about the harbour, and stating that it was "chiefly remarkable for its splendid churches and kindred institutions", the author describes the harbour:

> "rude fishing flakes . . . , platforms of poles and dried twigs, on which the cod are spread to dry . . . wharves, at which are moored schooners with thier catch and foreign-going vessels loading for market. . . . [and] substantial warehouses . . . packed with codfish. . . . Water Street [was] lined with splendid shops, where one might buy the finest fabrics or the most indispensible fishing requisites"
>
> (McGrath, 1899: 9-12).

Once, again, the description is most notable for its similarity to those of the pre-Fire city.

Plainly, it would be desirable at this point to have some sources of "hard" and easily comparable data. Unfortunately, the only ready-made sources are the 1891 and the 1901 censuses. (See Appendix A.) Because the latter is six years after the nominal end of the rebuilding period, it cannot be used with complete confidence. Any change in numbers -- of people, of houses, or of industries -- cannot be assumed to be the result of the Fire. However, it may be

numbers -- of people, of houses, or of industries -- cannot be assumed to be the result of the Fire. However, it may be possible to assume that the Fire was the major cause of any locational shifts.

In 1901, for example, the East End had less than half the number of factories that it had had in 1891, while the West End (only a relatively small part of which was burnt) had a few more. The location of other places of employment in the two census divisions seems to have changed as well, although the figures for the two years may not be exactly comparable. Most dramatic of the differences is that the East End, in 1891, had 33 of the 68 "mercantile permises" in the city and suburbs, while in 1901, it had only 35 of the 166 "commercial premises".

Similar shifts can be seen in residential patterns. In 1901, the East End and suburbs had only 96% of the population and 96% of the number of houses that it had had in 1891. While the decline of 4% is very small, it should be compared with the growth of the West End and suburbs, which experienced a 16% increase in population, and a 20% increase in the number of houses[2]. The contrast is the more revealing since we know from other sources that considerable suburban growth had occurred in both census divisions.

---

2 The same set of figures can also be cautiously interpreted as indicating that any crowding of refugees into existing residences in the West End had been abated by 1901. In fact, for both East and West, the numbers of persons per house and of families per house had returned to almost their 1891 values.

Certainly, some very obvious morphological changes had been made. Some streets in the study area, especially Duckdworth and Water, had been straightened, while others, like Prescott, had been regraded. Many interior streets had been re-aligned, and Bond Street had been created (See Map VIII:1). The development of the comparison area had continued as well. New buildings had appeared on previously vacant land, filling in, and extending the limits of, the suburbs.

Another very obvious morphological change was in the style of the buildings, especially that of the residential ones. Before the Fire, most of these were fairly plain, with saddle roofs and similar dormers. Other styles also existed: one of these, recently introduced, and called after its architects, "Southcott", was known for its mansard roofs, bay windows, and hooded dormers. After the Fire, this became the style, accepted so completely that it is now thought of as the typical style of old St. John's (O'Dea, 1974).

The intensity of land use, as Table VII:1 shows, had also changed, decreasing somewhat in the study area, while increasing, more dramatically, in the comparison area. But while the study area was still more intensely developed than the comparison area, there was no longer as strong, or as clear, a distinction between the two as there had been before the Fire.

In addition, the waterfront sectors were no longer so clearly the most intensely developed ones of the study area.

TABLE VII:1

INTENSITY OF POST-FIRE LAND USE

| | Sector | Total Area (sq.ft.) | No. of Units | STRUCTURAL DENSITY (1) Average Ground Area Per Unit (sq.ft.) | Total Built-Upon Area* (sq.ft.) | (2) Density (as %) | "APPARENT DENSITY" (3) Frontage Per Unit (ft.) | No. of Contiguous Sets | (4) Average Contiguity | STREET NETWORK DENSITY Total Street Frontage (ft.) | (5) Area Per Foot Frontage (sq.ft.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COMPARISON AREA | A | 392183 | 113 | 3470.6 | 53485.0 | 13.6 | 45.1 | 51 | 2.22 | 5100 | 76.9 |
| | B | 273306 | 101 | 2706.1 | 52895.0 | 19.4 | 29.2 | 43 | 2.35 | 2950 | 92.7 |
| | C | 183315 | 56 | 3273.5 | 24437.5 | 13.3 | 45.2 | 30 | 1.87 | 2530 | 72.5 |
| | D | 283305 | 56 | 5059.0 | 41613.8 | 14.7 | 47.0 | 40 | 1.40 | 2630 | 107.7 |
| | TOTAL AREA | 1132109 | 326 | 3472.7 | 172750.0 | 15.3 | 40.5 | 164 | 1.99 | 13210 | 85.7 |
| STUDY AREA | E | 382184 | 123 | 3107.2 | 73812.5 | 19.3 | 36.0 | 37 | 3.33 | 4430 | 86.2 |
| | F | 296637 | 96 | 3090.0 | 61211.2 | 20.6 | 41.0 | 28 | 3.43 | 3940 | 75.3 |
| | G | 394405 | 166 | 2376.0 | 79917.5 | 20.3 | 26.0 | 43 | 3.86 | 4320 | 91.3 |
| | H | 614383 | 175 | 3510.8 | 169681.5 | 27.6 | 34.0 | 52 | 3.37 | 5950 | 103.3 |
| | I | 382740 | 118 | 3243.6 | 69580.0 | 18.2 | 34.9 | 40 | 2.95 | 4120 | 92.9 |
| | TOTAL AREA | 2070349 | 678 | 3053.6 | 446910.0 | 21.6 | 33.6 | 200 | 3.39 | 22760 | 91.0 |
| | GRAND TOTAL | 3202458 | 1004 | 3189.7 | 619660.0 | 19.3 | 35.8 | 364 | 2.76 | 35970 | 89.0 |

*Based on sample data.

Coefficients of Correlation:

| | Average Ground Area Per Unit | Density (as %) | Area Per Foot Frontage (sq.ft.) | Frontage Per Unit (ft.) | Average Contiguity |
|---|---|---|---|---|---|
| Average Ground Area Per Unit | — | | | | |
| Density (as %) | -.3113 | — | | | |
| Area Per Foot-Frontage (sq. ft.) | .4534 | .4128 | — | | |
| Frontage Per Unit (ft.) | .7280 | -.6313 | -.2750 | — | |
| Average Contiguity | -.6801 | .7281 | -.0557 | -.6953 | — |

In fact, in terms of average ground area per unit, they were the least intensely developed. More significantly, given the generally larger size of units in these sectors, H still had a considerably larger proportion of its ground area built upon than did any of the other sectors, while I had the least of those in the study area.

These variations in density were reflected in the streetscape. In at least one aspect, there were still definite differences between the study and comparison areas. No suburban sector had as many units per contiguous set as had the older study area. And, as had been true before the Fire, sectors with the most intense structural development did tend to have had both the least frontage per unit, and the most units per contiguous set.

Finally, it is apparent that the modifications of the study area's streets had resulted in a generally higher ratio of street length to area. The re-arrangement of the interior streets of Sector H produced the most dramatic of these changes, while the creation of new streets and parts of streets was responsible for most of the remaining change.

Changing the street pattern required, as we have seen, some modifications in ownership. Almost all of these modifications were, however, so small that they do not result in important differences in the data as compiled from the 1891 tax rolls. In any event, it would have been the pre-Fire patterns which would have affected the process and

TABLE VII:2

TENURE PATTERNS AND THE POST-FIRE INTENSITY OF LAND USE

COEFFICIENTS OF CORRELTATION

| | % Lots Leasehold | Index of Fragmentation |
|---|---|---|
| Average Ground Area Per Unit (sq. ft.) | -.6516 | .7515 |
| Density (as %) | -.2809 | -.2156 |
| Area Per Foot Frontage (sq. ft.) | -.5121 | .3019 |
| Frontage Per Unit (ft.) | -.3181 | .5918 |
| Average Contiguity | .2438 | -.6558 |

pattern of development. And, curiously, despite the findings of little relationship between tenure patterns and the intensity of pre-Fire land use, there appears to have been a slight tendency for sectors with a highly fragmented ownership to have had higher average ground areas per unit and fewer units per contiguous set.

These relationships, shown in Table VII:2, are certainly not so strong that they unequivocably support any hypothesized relationship between tenure patterns and these aspects of morphology. However, the fact that they appear in the examination of the post-Fire data (where all sectors were, as it happened, fairly recently built or rebuilt), but not in the examination of the pre-Fire data, does suggest that any impact tenure patterns might have had on development in the study and comparison areas was limited to those periods in which development or redevelopment were first initiated. Its impact on subsequent change, on the other hand, seems to have been small.

A more rigorous discussion of this point will be presented in Chapter VIII. The task of this chapter, however, is to determine whether or not the study and comparison areas still fit the model presented in Chapter IV. In this regard, it should be noted that, despite the extension of the suburbs and the overall changes in density, the study and comparison areas were still part of a "small" city: one which was compact and had plenty of land still

available within the limits of the available technology of transportation. In a sense, if the Fire weeded out some of the more marginal firms, and accelerated the growth of the suburbs, it also made the city, at least temporarily, that much "smaller".

Once again, the best way of examining this "small" city is by a tour of several of its streets. However, there are a few problems arising from the use of data from the 1894 directory. Two of these problems stem from the absence of street numbers in the majority of addresses.

This absence is particularly problematic where a street extended outside the study area. Although no real solution exists, it was possible, using various sources, to identify groups of listings almost certainly within the area, and groups almost certainly without it, leaving a (sometimes large!) residual of uncertain listings. These two sets of figures -- one being the almost-certainly-within and presumably an underestimate of the "real" figure, and the other being all listings minus the almost-certainly-without and presumably an overestimate -- will be presented wherever appropriate. Comparing the two figures should give the reader a good indication of the size and direction of any bias so introduced.

A fuller discussion of this procedure may be found in Appendix C. As an example, however, consider the way in which the two estimates were used to express changes in the

numbers of residential listings. In 1890, there were 1136 such listings; for 1894, the smaller estimate is 556, the larger, 781. In either case, this can be easily interpreted as a major decrease: the actual change was perhaps almost a halfing of the original number.

A second problem is that without street numbers it was impossible to group listings into "addresses" with anywhere the same confidence as was possible in using the 1890 directory. The result pertinent to this chapter is that it was also impossible to give accurate counts of residential-only, residential-and-commercial, and commercial-only addresses. It was possible to make rough groupings of similar surnames (see Appendix C) for each street entirely within the study area, and for each set of almost-certainly-within listings for its other streets. These could then be classified by use. But, because the counting system used had to be different from that used in the analysis of the pre-Fire data, and, especially because the set of almost-certainly-within listings is, in effect, an extremely biased sample, these counts of grouped listings should be regarded as suggestive only, and should not be directly compared -- except, perhaps, as they indicate proportions -- to the numbers of addresses of different types as presented in Table V:5.

A final problem is that the 1894 directory does not list domestics. This means that one of the most useful indicator occupations is not available.

Despite these problems, the study and comparison areas can be checked against the hypothesized patterns. First, there was, as expected, a strong commercial presence on the main streets closest to the harbour. As Table VII:3 shows, Water and Duckworth Streets together had but two purely residential units. On Water Street, more than half of the 65 units were non-consumer-oriented commercial, such as warehouses. Some of these were located between the backs of more consumer- oriented ones and the waterfront, but many faced directly onto the south side of the street.

The north side of Water Street was more consumer-oriented: here could be found four saloons and a restaurant, along with several shops, including groceries, a druggist's, and a china dealer's.

The commercial importance of the street was not reflected in an intense use of its land. A large area was used for open storage, and another for a stonecutter's yard. Yet, in a rearrangement of building orientation, no doubt made possible by the Fire, the units which had once faced the short streets off Water were rebuilt so that they now faced onto the main street.

Despite the highly commercialized appearance of Water and Duckworth Streets, they continued to serve residential functions, typically in units used both as the place of work and of residence by an artisan or shopkeeper. On Duckworth, for example, these included eight providers of food, four

TABLE VII:3

A TOUR OF POST-FIRE ST. JOHN'S - SELECTED STREETS OF THE STUDY AND COMPARISON AREAS

| Street | # of Units | Residential Only | Consumer-Oriented | Non-Consumer-Oriented | Other | # of Grouped Listings | Residential Only | Residential and Commercial | Commercial Only | # of Households | Clerks | Labourers | Fishermen | # of Employed Persons |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Street | 65 | 1 | 20 | 39 | 5 | 29 | 2 | 14 | 13 | 16/40 | 3 | 1 | 0 | 24 |
| Duckworth Street | 46 | 1 | 40 | 4 | 1 | 24 | 6 | 15 | 3 | 19/59 | 1 | 0 | 0 | 20 |
| Gower Street | 78 | 52 | 23 | 1 | 2 | 34 | 24 | 8 | 2 | 31/128 | 1 | 3 | 0 | 36 |
| Military (southside) | 38 | 30 | 5 | 2 | 1 | 27 | 24 | 3 | 0 | 28/36 | 4 | 0 | 0 | 38 |
| Prescott Street | 58 | 37 | 13 | 5 | 3 | 64 | 47 | 11 | 6 | 58 | 4 | 0 | 0 | 79 |
| King's Road | 58 | 38 | 11 | 4 | 5 | 46 | 41 | 5 | 0 | 46 | 2 | 10 | 1 | 56 |
| Cochrane Street | 59 | 43 | 11 | 0 | 5 | 60 | 59 | 1 | 0 | 58 | 9 | 5 | 1 | 72 |
| Sector H - off Water | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| -"interior" streets | 47 | 42 | 3 | 0 | 2 | 41 | 39 | 0 | 2 | 39 | 0 | 24 | 3 | 50 |
| Pilot's Hill and Gill Street | 25 | 18 | 0 | 2 | 5 | 25 | 24 | 0 | 1 | 25 | 1 | 10 | 5 | 28 |
| Flavin's Lane | 15 | 11 | 1 | 2 | 1 | 11 | 10 | 0 | 1 | 10 | 1 | 3 | 0 | 8 |
| Knight's Street | 10 | 8 | 0 | 1 | 1 | 11 | 11 | 0 | 0 | 15 | 5 | 3 | 0 | 21 |
| Cumming's Lane | 5 | 4 | 0 | 1 | 0 | — | — | — | — | — | — | — | — | — |
| British Square | 8 | 5 | 0 | 2 | 1 | 7 | 6 | 0 | 1 | 5 | 0 | 0 | 0 | 6 |
| Bond (entire street) | 33 | 29 | 0 | 1 | 3 | 23 | 21 | 2 | 0 | 23/52 | 1 | 4 | 0 | 32 |
| (East-West) | 26 | 24 | 0 | 1 | 1 | — | — | — | — | — | — | — | — | — |
| Bannerman (North-South) | 51 | 43 | 4 | 2 | 2 | 47 | 42 | 3 | 2 | 69 | 4 | 19 | 4 | 95 |
| Rennies Mill Road | 33 | 26 | 0 | 0 | 7 | | | | | 38 | | | | |
| Monkstown Road | 31 | 24 | 2 | 0 | 5 | | | | | 71 | | | | |
| Hayward Avenue | 51 | 41 | 2 | 1 | 6 | | | | | 102 | | | | |
| Barnes Rd & lanes | 64 | 53 | 7 | 1 | 3 | | | | | 115 | | | | |
| Maxse Street | 41 | 27 | 0 | 2 | 12 | | | | | 32 | | | | |
| Fleming & lanes | 28 | 21 | 2 | 1 | 3 | | | | | 29 | | | | |
| Circular Road | — | — | — | — | — | | | | | 25 | | | | |
| Belvidere | 19 | 18 | 0 | 0 | 1 | | | | | 24 | | | | |

See notes to Table V:5.

The atlas data in this table are for the same areas as in Table V:5 except for Bond (entire street). In other words, any change in numbers is by gain or loss within the pre-Fire limits of each street on the atlas sheets.

The directory data, on the other hand, is for the street as it was in 1894. Numbers of households are given, where necessary as "smaller estimate/larger estimate".

Cumming's lane was not listed in the 1894 directory.

providers of alcoholic beverages, a plumber, a harness maker, and a dealer in leather and leather findings.

Once above Duckworth, or in the interiors of the blocks below it, there were few residences which were also used commercially. And commercial uses in general fall off rapidly past Gower Stret. There were, of course, exceptions: Flavin Street had its electric light company; Military, its undertaker, and almost every street had a grocer or a small food shop. Only Rennie's Mill Road, in the suburban comparison area, was entirely without commercial uses.

In the absence of listings for domestics, it is hard to identify upper "class" streets. Certainly, Cochrane, Military, Gower, Queen's and Water Street show unusually high proportions of clerks, and low ones of the two lower "class" occupations. These, on the other hand, are more common on the interior streets of the waterfront sectors, and on less minor streets, such as King's, Bond, and Bannerman.

While these post-Fire data are too skimpy to show the kinds of social groupings previously demonstrated for the pre-Fire study and comparison areas, they do at least suggest that there was a tendency towards the residential separation of different groups, and perhaps even that many of the lower "classes" did tend to live away from the major streets.

However, it is hard to get any truly vivid picture of post-Fire St. John's. It was still economically focussed upon, and geographically arranged about, its waterfront. It

did have growing suburban residential areas, although many of its residents still lived close to or in their places of work. It was compact, and had plenty of open space. All of these would seem to be typical of a small late nineteenth century port city.

Thus, we may tentatively assume that if the Fire had changed the city, it had not altered its fundamental character. But there had been some morphological changes. Some of these have already been touched upon: the modifications of the street pattern, changes in the numbers and sizes of units, and in the intensity of land use; and a shifting of the mix of uses of various kinds.

Seeking out the relationships between some of these changes, and the role of some constraining influences upon them and the rebuilding of the city, will be the work of the next chapter.

# VIII. REBUILDING THE CITY: CHANGE AND STABILITY

> But the truth is that at no period in urban history has a city been simply a matter of contemporary practices, and thus free of either the past or the future.
>
> James E. Vance, Jr., This Scene of Man (1977: 24)

The previous chapters have hinted at the changing characteristics of some aspects of late nineteenth century St. John's, along with the persistence of certain others. In this chapter, the presence or absence of change in a number of these characteristics, within the study and comparison areas, will be dealt with in greater, and more quantified, detail. Finally, the role of certain constraints, as hypothesized in Chapter IV, will be considered.

## The Nature and Extent of Change: A Look at the Atlases

The first and simplest measure of change in the study and comparison areas is derived from the numbers of units shown on the pre- and post-Fire insurance atlas sheets. As Table VIII:1 shows, the nine sectors mapped both before and after the Fire (See Maps VIII:1 and VIII:2), taken as a whole, did lose a small number of units. As might be expected, sectors within the study area lost (although in some cases, only modestly), while sectors in the comparison area either remained relatively stable or gained.

TABLE VIII:1

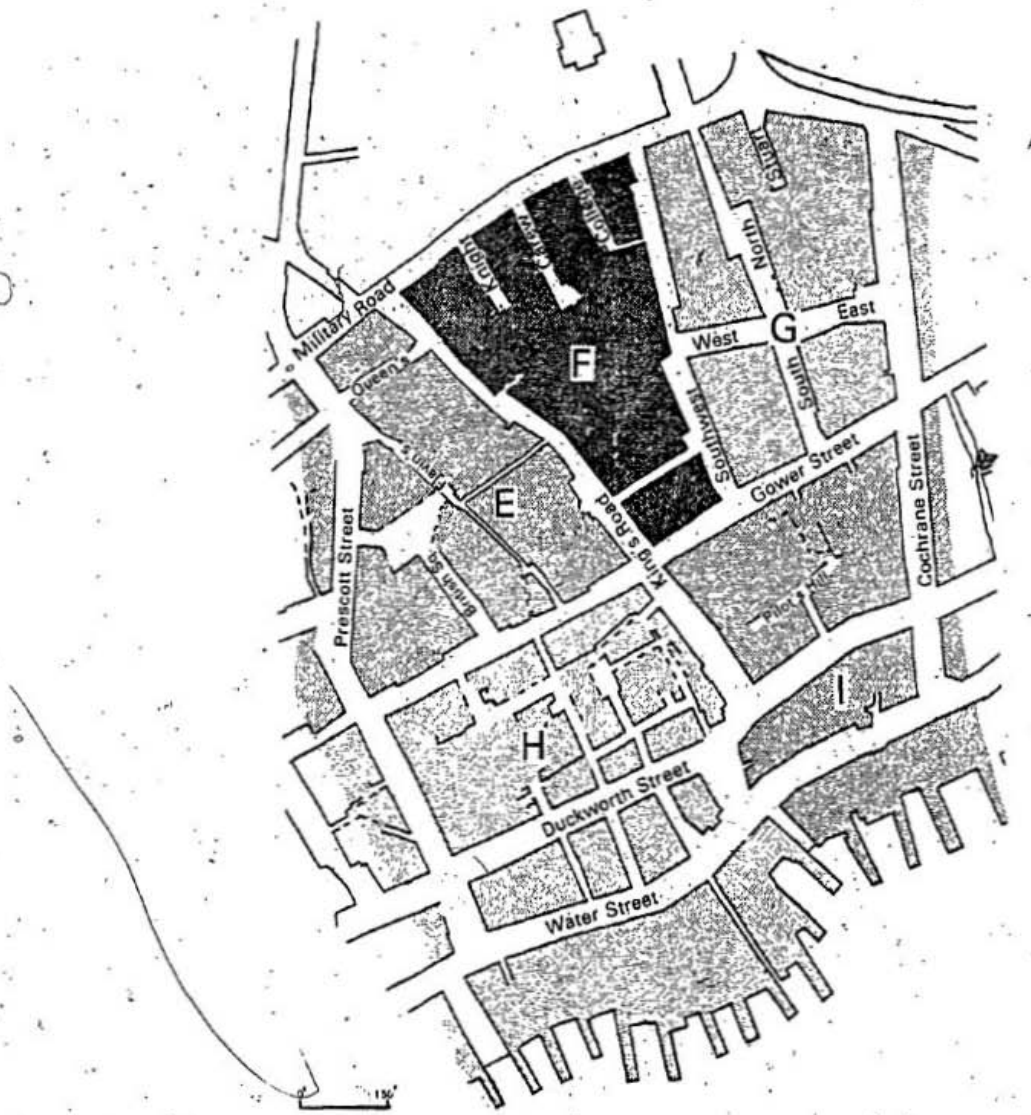
CHANGES IN NUMBERS OF UNITS AND IN ESTIMATED FLOOR AREA

| | | # of Units | | | Estimated Floor Area* (sq.ft.) | | |
|---|---|---|---|---|---|---|---|
| | | Pre | Post | % | Pre | Post | % |
| COMPARISON AREA | A | 67 | 113 | +68.7 | 67705.0 | 98752.5 | +45.9 |
| | B | 75 | 101 | +34.7 | 52325.0 | 100192.5 | +91.4 |
| | C | 50 | 56 | +12.0 | 27817.5 | 46157.5 | +65.9 |
| | D | 57 | 56 | - 1.7 | 57480.0 | 91940.0 | +59.9 |
| AREA TOTAL | | 249 | 326 | +30.9 | 198232.5 | 338870.0 | +70.9 |
| STUDY AREA | E | 170 | 123 | -27.6 | 179005.0 | 176935.0 | - 1.2 |
| | F | 101 | 96 | - 4.9 | 92060.0 | 133479.0 | +45.0 |
| | G | 174 | 166 | - 4.6 | 184697.5 | 173320.0 | - 6.2 |
| | H | 274 | 175 | -36.1 | 447382.5 | 699384.7 | +56.3 |
| | I | 144 | 118 | -18.1 | 251630.0 | 154451.7 | -38.6 |
| AREA TOTAL | | 863 | 678 | -21.4 | 1129756.5 | 1027857.5 | - 9.0 |
| GRAND TOTAL | | 1112 | 1004 | - 9.7 | 1327989.0 | 1366727.5 | + 2.9 |

*Based on sample data.
See Appendix B for a discussion of sampling methods. Note also that the aggregations for the areas are not simply the sum of the aggregations for the sectors, but are separately calculated.

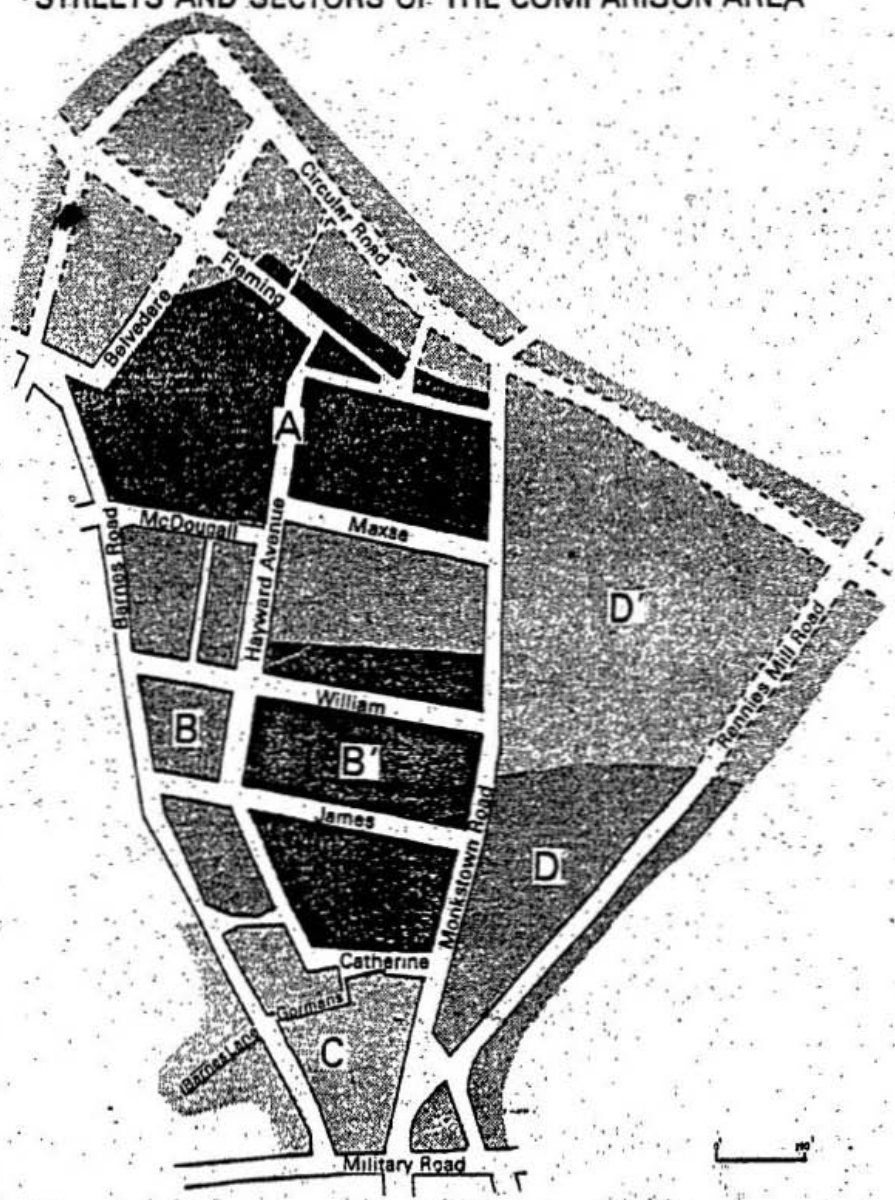
Map V:3

STREETS AND SECTORS OF THE PRE-FIRE STUDY AREA



Map V:4

STREETS AND SECTORS OF THE COMPARISON AREA



A loss of units, however, need not have necessarily meant a loss of actual space. This may have been especially true in the commercial areas, particularly if, as hypothesized, firms used the need for rebuilding as an opportunity to adjust form to function. An increasing scale of business operations might well have resulted in fewer, but larger, units.

As it happened, there was a small general loss (about 9.0%) in total floor area over the five sectors of the study area. As shown in Table VIII:1, some sectors gained, and some lost, space. But there is no direct link between changes in number and changes in size. For example, the two commercialized sectors (H and I), which might be expected to have experienced similar change, did not. Sector H experienced the greatest relative loss in units, but the greatest gain in total floor area, while I showed only a modest relative loss in units, but the greatest loss in total floor area. Much the same comments could be made about the three other, more residential, sectors.

Total floor area, of course, would have increased in the expanding suburban comparison area as new structures were built. One would expect that, unless the new buildings, or the mix of types of new buildings, were considerably different from the old, the increase in size would be closely related to the increase in units. In fact, there is no relationship. As a result, it is clear that this area, like

the study area, did experience considerable change from one period to the other.

These changes were both in the mix of types within sectors, and in the size of the new buildings. For example, one of the most important changes in Sector I was the decrease in the average size of its warehousing, which resulted in a total loss of nearly 80% (from 61717.5 to 14300 sq. ft.) despite the gain of an additional warehouse[1]. On the other hand, almost the entire numerical loss in this sector can be explained by its loss of 24 residences.

By using a form of "shift-share" analysis, the change in mix by sectors can be shown quite clearly. Since purely residential uses were by far the largest single component in all sectors, these will be dealt with first. The analysis is presented in Table VIII:2, which shows the number of these units to have declined over the entire study and comparison areas, taken together. By calculating, for each sector, what the post-Fire number of residences would have been, had that sector's change in all units been evenly distributed over all types of uses, and by comparing these figures -- "shares" -- with the actual change, the increase or decrease due to "shifts" in the mix if uses can be identified.

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1 These figures are based on sample data.

Total storage space in this sector may not have been reduced quite as drastically as these figures suggest. An area devoted to the outdoor storage of lumber before the Fire was very greatly enlarged after.

TABLE VIII:2

CHANGE IN THE MIX OF USES: THE RESIDENTIAL COMPONENT

| | | # of Units Pre-Fire | Post-Fire | Actual Change | "Share" | "Shift" |
|---|---|---|---|---|---|---|
| COMPARISON AREA | A | 52 | 86 | +34 | 35.7 | - 1.7 |
| | B | 66 | 81 | +15 | 22.9 | - 7.9 |
| | C | 41 | 41 | 0 | 4.9 | - 4.9 |
| | D | 36 | 41 | + 5 | - .6 | 5.6 |
| AREA TOTAL | | 195 | 249 | +54 | 60.2 | - 6.2 |
| STUDY AREA | E | 136 | 93 | -43 | -37.5 | - 5.5 |
| | F | 81 | 64 | -17 | - 4.1 | -12.9 |
| | G | 143 | 136 | - 7 | - 6.6 | - .4 |
| | H | 115 | 70 | -45 | -41.5 | - 3.5 |
| | I | 83 | 59 | -24 | -15.0 | - 9.0 |
| AREA TOTAL | | 558 | 422 | -136 | -119.0 | -17.0 |
| GRAND TOTAL | | 753 | 671 | -82 | -73.0 | - 9.0 |

In all but one sector (D), residential uses were relatively less important in the post-Fire mix of uses then they had been in the pre-Fire mix. This shift in mix is evident both in the comparison area, which in absolute terms gained residential units, and in the study area, which lost these. But, in this area, the shift to other use-types was, with the exception of sector F's, less important than was the overall loss of units of every kind. Sector G, in fact, showed a remarkably small change in the number of its units used for purely residential purposes.

The same type of analysis (presented in Table VIII:3) can be used to examine consumer-oriented commercial uses. These (shops, establishments offering food, drink, or lodging, and other small scale providers of goods and services) made a slight increase in numbers over the two areas. Not surprisingly, since units declined, they made up a larger proportion of units on the post-Fire atlas sheets than they had on the earlier ones. The single case where the shift in mix was less important than the general loss in units was in sector H, which lost just about as many of these consumer-oriented uses as it would have had its general loss of units been evenly distributed. It should be pointed out that this sector was, before the Fire, the most highly commercialized of all sectors, and was the only one which actually lost numbers of these units.

Non-consumer-oriented commercial uses (factories,

TABLE VIII:3

CHANGE IN THE MIX OF USES: THE CONSUMER-ORIENTED COMMERCIAL COMPONENT

| | | # of Units Pre-Fire | # of Units Post-Fire | Actual Change | "Share" | "Shift" |
|---|---|---|---|---|---|---|
| COMPARISON AREA | A | 2 | 6 | + 4 | + 1.8 | + 2.2 |
| | B | 1 | 3 | + 2 | 0 | + 2.0 |
| | C | 3 | 8 | + 5 | + .4 | + 4.6 |
| | D | 2 | 4 | + 2 | 0 | + 2.0 |
| AREA TOTAL | | 8 | 21 | +13 | + 2.5 | +10.5 |
| STUDY AREA | E | 12 | 16 | + 4 | - 3.0 | + 7.0 |
| | F | 4 | 14 | +10 | - .2 | +10.2 |
| | G | 10 | 17 | + 7 | - .5 | + 7.5 |
| | H | 88 | 58 | -30 | -31.8 | + 1.8 |
| | I | 32 | 34 | + 2 | - 5.8 | + 7.8 |
| AREA TOTAL | | 146 | 139 | - 7 | -31.2 | +24.2 |
| GRAND TOTAL | | 154 | 160 | + 6 | -14.9 | +20.9 |

warehouses, and offices)[2] also increased slightly. As shown in Table VIII:4, changes in the mix again tended to predominate over changes in the overall numbers of units. Sector H was again the exception: while it "ought" to have lost 15 of these units, it, in fact, lost only three.

Some summarization of these findings is in order. First, they suggest a decreasing residential character over the entire pair of areas, even in those sectors which made absolute gains in numbers of purely-residential units. The two exceptions are sectors D (the rather prosperous area of large homes on Rennie's Mill and Monkstown Roads) which became even more residential in character, and G (a somewhat less prosperous area, but one which did, perhaps significantly, include a major street, Cochrane, with well-to-do residents). Sector G retained very nearly the same proportion of purely-residential units to other use-types.

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2 The rather awkward phrase "Non-consumer-oriented commercial" was chosen instead of "industrial" because the distinction to be emphasized is not commercial vs. industrial, but consumer vs. non-consumer. Those offices shown on the atlas sheets seem to fit this category best. However, since there are only 9 offices before the Fire, and 10 after, the phrase can almost be interpreted as meaning industrial. All of the offices were in either sector H or I. Their small number, lack of change, and concentration in these two sectors, means that their inclusion in this category, rather than consumer-oriented commercial, would hardly affect the analysis of either.

TABLE VIII:4

CHANGE IN THE MIX OF USES: THE NON-CONSUMER-ORIENTED COMMERCIAL COMPONENT

| | # of Units Pre-Fire | # of Units Post-Fire | Actual Change | "Share" | "Shift" |
|---|---|---|---|---|---|
| A | 2 | 1 | - 1 | + 1.4 | - 2.4 |
| B | 0 | 3 | + 3 | 0 | + 3.0 |
| C | 1 | 1 | 0 | 0 | 0 |
| D | 1 | 0 | - 1 | 0 | - 1.0 |
| AREA TOTAL | 4 | 5 | + 1 | + 1.2 | - .2 |
| E | 5 | 8 | + 3 | - 1.4 | + 4.4 |
| F | 3 | 6 | + 3 | - .2 | + 3.2 |
| G | 3 | 3 | 0 | - .1 | + .1 |
| H | 41 | 38 | - 3 | -14.8 | +11.8 |
| I | 17 | 16 | - 1 | - 3.1 | + 2.1 |
| AREA TOTAL | 69 | 71 | + 2 | -14.8 | +16.8 |
| GRAND TOTAL | 73 | 76 | + 3 | - 7.1 | +10.1 |

An increase in commercialization was also general to both areas, although it is only in the study area -- both before and after the Fire -- that numbers of commercial uses were so large that it is really possible to speak of a "commercial character". The most interesting trend is that all this burnt area's sectors, except its most commercialized, posted an absolute gain in commercial units, and became, in proportionate terms, more commercialized. Sector H, on the other hand, showed large absolute losses of commercial units, and particularly, of consumer-oriented ones. But, because it lost non-commercial units even more extensively, it too became proportionately speaking, more commercialized.

The increasing commercialization of the numerical mix of use-types in the burnt district was not directly reflected in the proportion of its total estimated floor area devoted to commercial uses. As Table VIII:5 shows, in general, these uses lost ground -- although given the inherent inaccuracies of this measure, a difference in percentage points as small as that between total floor area and commercial floor area ought not to be given too much weight.

Unfortunately, the sample size of some use-types within some sectors prevents the complete analysis of proportional changes in the floor area devoted to different uses. Some patterns of change, however, can be identified, using Table VIII:5. For example, the three sectors north of Gower Street

TABLE VIII:5

CHANGES IN COMMERCIAL USES IN THE STUDY AREA

| | | SECTOR E | | SECTOR F | | SECTOR G | | SECTOR H | | SECTOR I | | STUDY AREA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | # | Floor Area* | # | Floor Area* | # | Floor Area* | # | Floor Area* | # | Floor Area* | # | Floor Area* |
| Shops and other Consumer Oriented | Pre | 10 | N.A. | 3 | N.A. | 10 | N.A. | 80 | 162000 | 26 | 52000 | 129 | 235672.5 |
| | Post | 15 | N.A. | 14 | N.A. | 16 | N.A. | 50 | 128000 | 28 | 45616.7 | 123 | 199985 |
| | % | +50.0 | N.A. | +366.6 | N.A. | +60.0 | N.A. | -37.5 | -20.0 | + 7.7 | -12.3 | - 4.6 | -15.1 |
| Food, Drink, Lodging | Pre | 2 | N.A. | 1 | 450 | 0 | 0 | 8 | 18580 | 5 | 55500 | 17 | 75202.5 |
| | Post | 1 | 1125 | 0 | 0 | 1 | 3275 | 8 | 19800 | 6 | 9000 | 16 | 33422.5 |
| | % | -50.0 | N.A. | -100.0 | -100.0 | U. | U. | 0 | + 6.6 | 0 | -83.8 | - 5.8 | -55.6 |
| Offices | Pre | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 14420 | 1 | N.A. | 9 | 19462.6 |
| | Post | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 16152.5 | 3 | N.A. | 10 | 20667.5 |
| | % | 0 | 0 | 0 | 0 | 0 | 0 | -12.5 | +12.0 | +200.0 | N.A. | +11.1 | + 6.2 |
| Factories | Pre | 4 | 16182.5 | 2 | 2700 | 2 | 2812.5 | 8 | 16525 | 7 | 8112.5 | 23 | 46332.5 |
| | Post | 6 | 25600 | 5 | 7275 | 3 | 6287.5 | 6 | 29662.5 | 3 | 3800 | 23 | 72625.0 |
| | % | +50.0 | +58.2 | +150.0 | +169.4 | +50.0 | 123.6 | -25.0 | +79.5 | -57.1 | -53.2 | 0 | + 56.7 |
| Warehouses | Pre | 1 | N.A. | 1 | N.A. | 1 | N.A. | 25 | 122437.5 | 9 | 61717.5 | 37 | 200977.5 |
| | Post | 2 | N.A. | 1 | N.A. | 0 | 0 | 25 | 157625 | 10 | 14300 | 38 | 186636 |
| | % | +50.0 | N.A. | 0 | N.A. | -100.0 | -100.0 | 0 | +28.7 | +11.1 | -76.8 | + 2.7 | - 7.1 |
| Total Commercial Uses | Pre | 17 | 48735 | 7 | 15065 | 13 | 26520 | 129 | 333962.5 | 49 | 177330 | 215 | 577647.5 |
| | Post | 24 | 60925 | 20 | 34946.5 | 20 | 35562.5 | 96 | 618202.2 | 30 | 78919.2 | 210 | 313335 |
| | % | +41.2 | +25.0 | +185.7 | +132.0 | +53.8 | +34.0 | -25.6 | + 85.0 | + 2.0 | -55.5 | - 2.3 | -11.1 |
| Total, All Uses | Pre | 170 | 179005 | 101 | 92060 | 174 | 184697.5 | 274 | 447382.5 | 144 | 251630 | 863 | 1129756.5 |
| | Post | 123 | 176935 | 96 | 133479 | 166 | 173320 | 175 | 699384.7 | 118 | 154451.7 | 678 | 1027857.5 |
| | % | -27.6 | - 1.2 | - 4.9 | +45.0 | - 4.6 | - 6.2 | -36.1 | +56.3 | -18.1 | -38.6 | -21.4 | - 9.0 |

*Based on sample data. See Appendix B for a discussion of sampling methods. Note also that the aggregations are separately calculated.

N.A. indicates there were too few uses of that type in that sector to sample.

U. indicates undefined.

(E, F, and G), which, before the Fire, had relatively small proportions of commercial units, were clearly more commercialized after the Fire. While these sectors made slight gains in numbers (and presumably in area) of shops and other consumer-oriented establishments, the most interesting change was in the category for factories, of which both the numbers and total sizes nearly doubled. This area, then, became not only more commercialized, but also more industrialized.

In the commercial core of the city, represented here by sector H and (to a lesser extent) I, changes in commercial use were more complex. Sector H, which lost 25% of its numbers of commercial untis increased its total estimated floor area by 85%. I, on the other hand, was numerically quite stable, but lost a good deal of its commercial floor area. Some of I's areal loss, it is true, was the result of the destruction of a single very large building, the Atlantic Hotel, with a floor area of about 26000 square feet. However, sector H also lost an extremely large building (the Academy Club and City Hall Skating Rink with a little more than 8000 square feet). Since this building was classified as non-commercial, its loss only emphasizes the increasingly commercial use of space within this sector.

Combined with the numerical loss of commercial units, the gains in space suggest that the hypothesized use of the Fire as an opportunity for the adjustment of form to function

did occur, at least in this highly commercialized core. Figure VIII:1 shows, at the extreme left edge of the area shown, one example of this: four small abutting 1 to 2 1/2 storey buildings containing a total of about 7000 square feet were replaced by one of the largest post-Fire buildings measured, a 3 storey structure containing more than 123000 square feet.

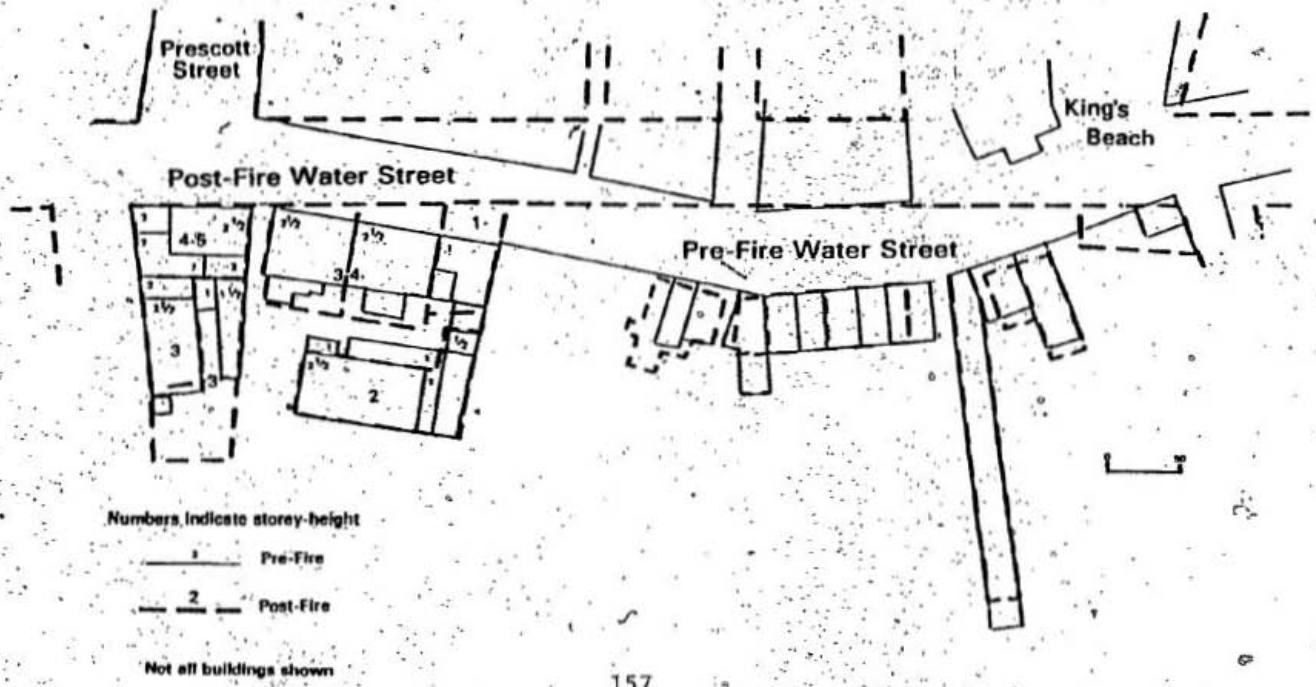
The gains in commercial space in this sector were, quite evidently, not of consumer-oriented uses. These declined strongly here (and less strongly in sector I). This is another aspect of the change, mentioned in the previous chapter, in the type of units facing the southern side of Water Street. While these units, before the Fire, tended to be the consumer-oriented portions of the merchants' premises, they were often replaced by units (such as warehouses), classified as non-consumer-oriented.

## The Nature and Extent of Change: A Look at the Directories

So far, it has been the buildings of the study and comparison areas, and the uses made of them, which have been of primary interest. Using information gleaned from the sheets of the insurance atlases, several aspects of these areas, both before and after the Fire, and some of the differences between them in the two periods, have been described. A few of the more important of these differences are the result of the residential development of much of the

Figure VIII:1

## A COMPARISON OF PRE- AND POST-FIRE WATER STREET



comparison area, and the increasing commercialization -- not to say industrialization -- of some parts of the study area.

One failing, however, of the atlas data is that only units which contained neither commercial or other uses could be classified as residential. As we have seen, these "purely-residential" units were only a part of the total housing stock in the two areas. In order to get a better picture of the changes in this aspect, it is necessary to see whatever redistribution of households might have occurred. While no exact record of this exists, some approximations can be made, using the directory listings for the study and comparison area in 1890 and 1894.

There are many problems involved in the use of this kind of data. Some, particularly those arising from the inadequacies of directories in general, have already been described, in Chapter III. Others, specific to the period, area, and method of this study are discussed in Appendix C.

Briefly, the first of these specific problems involves the need to select the level of aggregation so that it is suitable for the least detailed set of listings -- usually the 1894 ones. A second, mentioned in the previous chapter, involves the handling of 1894 listings without street numbers on streets which extended outside the areas studied. A related problem involves streets with names similar to, or identical with, names of streets in other parts of the city.

For all these problems, various technical solutions were possible. These were not always good methodological solutions, as they tend to introduce some biases into the data. The size and direction of these biases is, furthermore, unknowable.

This is also the case with a final problem. This is the considerable variation which appears to occur between directories, in the quality and inclusiveness of their coverage. While it would be convenient to assume that their quality varies systematically (an assumption that would clearly allow the comparison of relative values), such an assumption is not possible. If social class, for instance, affects the probability of an individual's inclusion in a directory, as has been suggested in Chapter III, then a change in the social class of an area could, without change in actual numbers -- in real population -- result in a change in the number of listings from one directory to the next. Other examples could be provided, each with a different effect on the biases introduced.

However, despite these difficulties, and because findings from the directory data can be compared with findings from the atlas data, the listings can be used to suggest trends in the location and relocation of the people and households of the study and comparison areas.

The numbers of residential listings[3] in the study and comparison areas did fall -- from 2180 in 1890 to 1573 in 1894 (or 1814, using the larger estimate). This indicates a fall of somewhere between 19 and 28 per cent. And, as Table VIII:6 shows, at least in the aggregate, the pattern of change was similar to the pattern of change in residential units: the unburnt comparison area gained listings, while the burnt study area lost. Quite similar patterns can also be seen in the changes in number of households, given in Table VIII:7.

Within the study area, the losses were particularly striking on Water, Duckworth, Gower, and Queen's, four of the major streets paralleling the harbour. Even calculated on the basis of the larger estimate, which certainly includes far more listings than the "real" number, the decreases in listings ranged from about 26 to about 46 per cent, and in households from about 12 to about 33 per cent. The size of these declines, despite the overestimation, suggests they may have been part of a more general loss of residential functions from the entire lengths of these streets, and not just from the sections within the area studied[4].

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3 - The reader is reminded that the compilers of the directory did not attempt to include everybody, but only adult males, and working and widowed adult females.

4 - These data were not collected for, and are entirely inadequate to, a true test of this point. But, if the rest of these streets had not lost listings the over-estimate would have been even greater.

TABLE VIII:6

CHANGES IN NUMBERS OF RESIDENTIAL DIRECTORY LISTINGS

| Street | COUNT (OR SMALLER ESTIMATE) 1890 | 1894 | % | LARGER ESTIMATE (WHERE NEEDED) 1890 | 1894 | % |
|---|---|---|---|---|---|---|
| Belvidere | 21 | 33 | + 57.1 | | | |
| Barnes and lanes | 108 | 150 | + 38.9 | | | |
| Hayward Ave. | 78 | 85 | + 9.0 | | | |
| Monkstown Rd. | 80 | 102 | + 27.5 | | | |
| Rennies Mill Rd. | 56 | 51 | - 8.9 | | | |
| Circular Rd. | 31 | 40 | + 29.0 | | | |
| Fleming and lane | 35 | 60 | + 71.4 | | | |
| Maxse | 30 | 38 | + 26.6 | | | |
| William | 53 | 86 | + 62.3 | 66 | 86 | +30.3 |
| James (Mullock) | 74 | 88 | + 18.9 | 125 | 88 | -29.6 |
| Catherine | 12 | 20 | + 66.7 | | | |
| Military (north) | 14 | 8 | - 42.9 | 14 | 15* | + 7.1 |
| AREA TOTAL | 592 | 761 | + 28.5 | 656 | 768 | +17.1 |
| Prescott | 140 | 105 | - 25.0 | | | |
| British Sq. | 38 | 6 | - 84.2 | | | |
| Flavin's | 41 | 10 | - 75.6 | | | |
| King's | 192 | 67 | - 65.1 | | | |
| Cummings | 14 | 0 | -100.0 | | | |
| Knight | 27 | 26 | - 3.7 | | | |
| Carew | 18 | 29 | + 61.1 | | | |
| College | 19 | 21 | + 10.5 | | | |
| SouthWest(Colonial) | 94 | 92 | - 2.1 | | | |
| South and North (Bannerman) | 128 | 100 | - 21.9 | | | |
| Stuart | 11 | 12 | + 9.1 | | | |
| Cochrane | 126 | 87 | - 30.9 | | | |
| Interior Streets Sector H | 168 | 44 | - 73.8 | | | |
| Holloway (south) | 6 | 0 | -100.0 | | | |
| Pilot's Hill | 34 | 28 | - 17.6 | | | |
| Military (south) | 50 | 67 | + 34.0 | 50 | 75* | +50.0 |
| Queen's | 69 | 5 | - 92.7 | 69 | 39 | -43.5 |
| East and West, etc. (Bond) | 49 | 35 | - 28.6 | 49 | 79 | +61.2 |
| Gower | 196 | 36 | - 81.6 | 196 | 105 | -46.4 |
| Duckworth | 99 | 22 | - 79.8 | 99 | 75 | -26.3 |
| Water | 79 | 25 | - 68.3 | 79 | 51 | -39.2 |
| AREA TOTAL | 1598 | 815 | - 49.0 | 1598 | 1046 | -34.1 |
| GRAND TOTAL | 2190 | 1576 | - 28.0 | 2254 | 1814 | -19.2 |

*In the absence of street numbers, the division of listings in this set into north and south sides was quite arbitrary: half to one, half to the other.

TABLE VIII:7

MOBILITY PATTERNS

| | Street | Households 1890 | 1890 Households Which Left # | 1890 Households Which Left % | 1890 Households Leaving & Replaced # | 1890 Households Leaving & Replaced % | Households 1894 | Households 1894 % |
|---|---|---|---|---|---|---|---|---|
| COMPARISON AREA | Belvidere | 20 | 13 | 65.0 | 17 | 130.8 | 24 | + 20.0 |
| | Barnes and lanes | 88 | 40 | 45.4 | 70 | 175.0 | 115 | + 34.1 |
| | Hayward | 70 | 48 | 68.6 | 41 | 85.4 | 102 | - 10.0 |
| | Monkstown | 55 | 24 | 43.6 | 40 | 166.7 | 71 | + 29.1 |
| | Rennies Mill | 35 | 16 | 45.7 | 19 | 118.7 | 38 | + 8.6 |
| | Circular | 21 | 12 | 57.1 | 16 | 133.3 | 25 | + 19.0 |
| | Fleming and lanes | 29 | 12 | 24.5 | 18 | 150.0 | 29 | + 20.7 |
| | Maxse | 29 | 14 | 48.3 | 17 | 121.4 | 32 | + 10.3 |
| | William | 46/57 | 19/30 | 41.3/52.6 | 29 | 152.6/97 | 56 | +21.7/-1.7 |
| | James (Hullock) | 51/96 | 18/63 | 35.3/65.6 | 37 | 205.6/58.7 | 70 | +37.2/-27.1 |
| | Catherine | 10 | 2 | 20.0 | 7 | 350.0 | 15 | + 50.0 |
| | Military (northside) | 12 | 6 | 50.0 | 1/8 | 16.7/133.3 | 7/14 | -41.7/-16.7 |
| | TOTAL | 466/522 | 224/280 | 48.1/53.6 | 312/319 | 139.3/112.5 | 554/561 | +18.9/+7.4 |
| STUDY AREA | Prescott | 84 | 66 | 78.6 | 40 | 60.6 | 58 | - 30.9 |
| | British Square | 26 | 25 | 96.2 | 4 | 16.0 | 5 | - 80.8 |
| | Flavin's | 24 | 21 | 87.5 | 7 | 33.3 | 10 | - 58.3 |
| | King's | 125 | 108 | 86.4 | 29 | 26.8 | 46 | - 63.2 |
| | Cummings | 10 | 10 | 100.0 | 0 | 0.0 | 0 | -100.0 |
| | Knight | 19 | 9 | 47.4 | 5 | 55.6 | 15 | - 21.0 |
| | Carew | 16 | 9 | 56.2 | 15 | 166.7 | 22 | + 37.5 |
| | College | 14 | 10 | 71.4 | 14 | 140.0 | 18 | + 28.6 |
| | Southwest (Colonial) | 71 | 47 | 66.2 | 37 | 78.7 | 61 | - 14.1 |
| | South and North (Bannerman) | 97 | 52 | 53.6 | 24 | 46.2 | 69 | - 28.9 |
| | Stuart | 8 | 3 | 37.5 | 3 | 100.0 | 8 | 0.0 |
| | Cochrane | 80 | 47 | 58.8 | 25 | 53.2 | 58 | - 27.5 |
| | Interior Streets Sector H | 124 | 102 | 82.3 | 17 | 16.7 | 39 | - 68.5 |
| | Holloway (south) | 6 | 6 | 100.0 | 0 | 0.0 | 0 | -100.0 |
| | Pilots Hill | 30 | 20 | 66.7 | 15 | 75.0 | 25 | -16.7 |
| | Military (southside) | 42 | 23 | 54.8 | 9/17 | 39.1/73.9 | 28/36 | -33.3/-14.3 |
| | Queen's | 44 | 39 | 88.6 | 0/27 | 0.0/69.2 | 5/32 | -88.6/-27.3 |
| | East and West (Bond) | 34 | 19 | 55.9 | 8/37 | 42.1/94.7 | 23/52 | -32.3/+52.9 |
| | Gower | 147 | 120 | 81.6 | 4/101 | 3.3/84.2 | 31/128 | -78.9/-12.9 |
| | Duckworth | 75 | 60 | 80.0 | 4/44 | 6.7/98.3 | 19/59 | -74.7/-21.3 |
| | Water | 60 | 50 | 83.3 | 6/30 | 12.0/60.0 | 16/40 | -73.3/-33.3 |
| | TOTAL | 1136 | 846 | 74.5 | 266/491 | 31.4/58.0 | 556/781 | -51.1/-31.2 |
| | GRAND TOTAL | 1602/1658 | 1070/1126 | 66.8/67.9 | 578/810 | 54.0/71.9 | 1110/1342 | -30.7/-19.1 |

Where needed larger estimate is placed after diagonal.

Apart from these major streets, there were 100% losses on Cummings, apparently because it was not rebuilt until somewhat later than 1894, and the section of Holloway between Duckworth and Water, which simply lost all of its residential units. Some other heavy losses were found for British Square, which was shortened, Flavin's, which was shortened and widened, King's, which was widened and straightened, and in the interior of the block bounded by Prescott, Gower, King's, and Duckworth, which was totally rearranged. While -- insofar as these modifications of street pattern reduced frontage length -- some losses of listings and of households were inevitable, the losses were too great to be explained by this alone. On the basis of this data, it is tentatively suggested that modification of street patterns did lead to especially large reductions in the numbers of people and of households living on these study area streets.

Finally, those few streets which showed increased listings were those furthest from the harbour: Military, three of the short streets running off Military, and possibly Bond. Very little modification occurred to any of the first four of these streets, or to the pre-Fire section of Bond. Bond, in any event, must be considered a dubious case: while the section of post-Fire Bond within the study area is roughly twice as long as the pre-Fire street, the cartographic evidence indicates that very little residential development occurred on the new portions. Thus, while the

"real" direction of change is unknowable, it is reasonable to assume that its magnitude was small.

Much the same comments could be made about changes in the numbers of households in the study area. The exception is Military Road. While the difference in direction of change is curious, it is probably only the result of the estimating procedure and of the arbitrary way in which unnumbered post-Fire listings and households were assigned to the north and south sides of the street (see Appendix C).

Next, it would be useful to determine how many people or households stayed on (or left and then returned to) a street during the period, how many came, and how many left. Given the nature of the hypotheses under consideration, households, rather than individuals, are the more important. This is, to say the least, fortunate, since matching individuals in the two directories would be a somewhat tendentious procedure. Households could, on the other hand, be identified with reasonable certainty in the 1890 directory. If any member of one of these households could then be located on the same street in the 1894 directory, that household was considered as having stayed on (or left and returned to) the street[5]. This procedure, especially because it was often possible to match more than one individual in a household, seems to provide acceptably accurate results.

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5 Conversely, a household which divided itself -- as for example, when a grown son left to start his own household, while the parents remained -- would still be considered to have stayed.

Two problems were that the number of members in the original household did slightly influence the probability of a match, and that streets which extended outside the area studied could also be credited with too many staying or returning households. There is little that can be done about these problems, other than to point out their existence.

All other households identified in the 1890 directory, but not matched with an 1894 household on the same street, can be thought of as ones which had moved away, or been disbanded. New households to the street could also be identified, although, because of the usual omission of street numbers in the 1894 directory, with considerably less certainty.

Table VIII:7 presents some of the results of this classification of households according to mobility status. First, of the total number of households in the study and comparison areas, less than 35% remained upon the same street over the period. Not surprisingly, fewer households left the comparison area, and more the study area. In general, the households leaving the streets of the comparison area were replaced by an even larger number of new ones, resulting in overall gains in numbers, and in a situation where most streets had more new households than old.

In contrast, the households leaving the study area were generally not completely replaced. Carew, College, Stuart, and possibly Bond, are the exceptions. Note that the first

three are the same short streets which also showed an increase in listings. As in the comparison area, most streets after the Fire had fewer old households than they did new, although the tendency was not nearly as strong in the study areas as it had been in the comparison area.

Rebuilding the City: Testing the Hypotheses

The analysis presented so far has suggested study and comparison areas which, while remaining typical of a "small" late nineteenth-century port city, did undergo a number of functional and other changes in the few years just around the Great Fire of 1892. But the most important of the hypotheses presented in Chapter IV revolve around the influence of certain characteristics of the pre-Fire city acting as constraints on the process and results of rebuilding. In testing these hypotheses, data for the study area alone will be used, but in considerably more detail than has been the case in the preceding pages of this thesis.

For these purposes, the study area has been divided into street-segments, each of which lies completely within a sector. Most atlas data, all tax roll data, and some directory data can be aggregated by these street-segments, and, as much as possible, the analysis will be made at this level.

Three comments should be made about these street-segments. First, the pre- and post-Fire versions of a

segment need not have had the same exact location. For example, the whole portion of Duckworth running between King's and Cochrane was straightened, bringing its centre about twenty-five feet closer to Water Street. Second, the creation of Bond Street after the Fire added two new segments to the forty-two pre-Fire segments. Third, while most of the segments include both sides of the street, a handful (such as segments of King's, Gower, and Colonial) are one-sided: these are the streets bounding the sectors, and the segments of these must be one-sided if all segments are to be nested into their sectors.

While the statistical analysis of these data was based on the street-segments, the tabular presentation is of data aggregated at the sector level. In addition, for the purposes of the statistical analysis, change in some variables has been expressed as an index derived by dividing the pre- and the post-Fire values of the variable by the average of the two. This has been done because the more usual method of expressing change as a percentage presents certain practical and paradigmatic difficulties. (See Appendix D for further discussion of these problems, and of the index used.)

However, percentages will be used in the discussion of these data because, as illustrations and summaries, percentage rates of change are far easier to interpret. Furthermore, in dealing with data aggregated at sector level,

most of the practical problems associated with the use of percentages disappear.

Some data, particularly those based on the 1894 directory, cannot be aggregated by street-segments, but only by named streets. Where necessary, then, the analysis will be performed at this considerably less detailed level.

Finally, since the study area was selected on very subjective grounds, and since the data are not based on a sample, but on an approximation of the entire population of units, firms, and households in the area, the usual statistical tests of significance are not appropriate.

The first step in dealing with the hypothesized role of constraining influences on the process of rebuilding is to test the extent to which it was also a process of replication. A very simple, if crude, test of this is provided by the correlations between a number of pre- and post-Fire variables. These are presented in Table VIII:8, while summaries of most of the original data can be found in the tables of other chapters and the preceding sections of this one.

As can be seen from Table VIII:8, a number of variable pairs were quite highly correlated, indicating that, in general, post-Fire values of these variables were related in a regular and linear way, to pre-Fire ones. But, most of the regression lines have slopes less than unity. This indicates that, in general, post-Fire values were lower than pre-Fire

TABLE VIII:8

THE EXTENT OF REPLICATION: SOME PRE- AND POST-FIRE VARIABLES

| Data Type | | Variable Pair | Correlation | Slope |
|---|---|---|---|---|
| STREET-SEGMENTS | | Number of Units | .9415 | .70 |
| | | Number of Residential Units | .9365 | .78 |
| | | Number of Consumer-Oriented-Commercial Units | .8392 | .68 |
| | | Number of Non-Consumer-Oriented-Commercial Units | .9578 | .94 |
| | | % Residential Units | .7949 | .87 |
| | | % Consumer-Oriented-Commercial Units | .7225 | .92 |
| | | % Non-Consumer-Oriented-Commercial Units | .4734 | .53 |
| | | Frontage Length | .9069 | .71 |
| | | Average Frontage Per Unit | .6321 | 13.3 |
| | | Average Number of Contiguous Units | .8530 | .92 |
| STREETS | Average Uses Per Unit | Smaller Estimate | .4039 | .58 |
| | | Larger Estimate | .7013 | 1.33 |
| | Number of Listings | Smaller Estimate | .6067 | .34 |
| | | Larger Estimate | .7447 | .44 |
| | Number of Households | Smaller Estimate | .6843 | .34 |
| | | Larger Estimate | .8308 | .58 |

ones. In addition, for the first four variable pairs, the intercepts were quite close to zero. This suggests a general pattern in which each street-segment lost a small number of units (or units of a particular use-type), and lost these more or less in proportion to its original number of units (or units of that type).

Some exceptions are apparent. One of these involves non-consumer-oriented commercial uses which showed, as might be expected in the light of previous results, a very small decrease (or more specifically, a slope less than unity). However, a note of caution is necessary here because the correlations of both actual and percentage values of the variables must be carefully considered. In contrast to consumer-oriented commercial units, which appeared in almost all street-segments, non-consumer-oriented ones were very highly concentrated in just a few segments. As it happens, these correlations do include a large number of cases where both the pre-Fire and the post-Fire values were zero. While these cases are perfectly valid instances of a lack of change, the bunching of values at the lower bound of the data -- since one cannot have negative numbers of units, or negative percents of them -- does limit the value of the correlation. As a result, it is perhaps more useful to note that 57% of all street-segments showed no change in number of non-consumer-oriented commercial uses, while only about 20% showed a change in excess of one. In comparison, consumer-

oriented uses were, as the correlations suggest, a little less stable -- 35% of street-segments showed no change, while slightly more than 30% showed a change in excess of two.

The differences in slopes for the first four variable pairs reflect the different rates of change for each type. This was seen earlier in the shifts in mix of use-types. And certainly, the mix of uses was less stable than were the actual numbers. The percent of post-Fire non-oriented uses on a street-segment cannot be related to that for the pre-Fire segment, while the tendency for other uses was to have shown slight losses (although, clearly, many segments would have shown increased percentages of one or another use-type).

Table VIII:8 indicates as well that the numbers of households, and the numbers of directory listings (the surrogate variables for population) changed, although less strongly, in this same regular way: a general decrease related to the size of the original figure. This is only as it should be, given the close logical (and statistical[6]) relationships between numbers of households and of listings and numbers of residential uses.

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6 The correlations between pre-Fire numbers of residential units, households, and listings; and those between post-Fire numbers of residential units, households, and listings; are all above .75 and usually above .85.

More ambiguous results pertain to the density of construction. The extent to which a street-segment presented an appearance of crowdedness seems to have increased slightly -- from an average of 3.3 units per contiguous set of units to one of 3.4. But the relationship between pre- and post-Fire values of this variable pair are again quite regular: the more a street was tightly packed with structures before the Fire, the more likely was it to be tightly packed afterwards. On the other hand, the amount of frontage per unit also increased, from an average of slightly more than 28 feet to one of slightly less than 34.

These results suggest that while there were fewer units (in this context, in proportion to available frontage) after the Fire than there had been before, what units there were were about as likely to be in actual physical contact with their neighbours. This in turn suggests an increase in the amount of frontage not containing a structure (either as non-built-upon frontage, or as the frontage of a side-yard or garden). Whether this increase in vacant frontage was the result of an increase in vacant land in parcels large enough to have held other units remains to be seen.

While the details of this analysis are complex, the general trend is clear. With the exceptions noted, the study area after the Fire did tend to replicate many of its pre-Fire aspects. Furthermore, while these aspects did change, the magnitudes of the changes were quite generally

influenced by the strength of the original aspects.

A second, and perhaps key, hypothesis for this part of the study area is that the post-Fire modifications of the street pattern would have greatly influenced the extent and nature of redevelopment. To test this hypothesis, the pre- and post-Fire frontage length of each street-segment was determined from the reconstructed atlas sheets. Frontage length can be thought of as buildable length (or both sides of the street, less the width of its intersections). This measure was chosen, rather than the somewhat simpler actual street length, because it includes the modest loss of buildable space resulting from street straightenings and from the widenings of cross streets. From this data, an index of change was derived[7].

An additional measure of the extent of modification is the length of post-Fire frontages which did not replicate pre-Fire ones. This includes both altogether new frontages, such as would result when a new street was added, and frontages which were relocated as the result of widenings and straightenings. Unlike the first variable, which is intended as a summary of overall, or system-wide, changes, this

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7 Originally, both street length and frontage length were measured. The correlation between the two was, as could be expected, quite high (.8829).

For details on the measurement of this data, see Appendix B; for details on the index, see Appendix D.

variable is meant to represent a property's probability of lying on a new or modified street-segment. As such, it is meant to approximate one aspect of the post-Fire situation facing potential builders and rebuilders: the extent to which a street-segment's relationship to pre-Fire property lines, and to other, more physical, relicts, had remained unchanged, and the extent to which these could be reused in the reconstruction of the city.

It should be noted, however, that since frontage change could only be determined by the visual comparison (aided by the use of overlays) of the maps for the two periods, this measure does not include the many very minor readjustments which undoubtedly occurred. Clearly, a certain amount of subjectivity was also involved in deciding whether some apparent differences in pre-and post-Fire frontages were real or cartographic. While the maps are regarded as generally accurate, it would never have been their surveyor's or cartographer's intent to have two from different periods compared in order to determine whether the real edge of a street had been shifted six inches to the left! But since most such minor changes would not have been particularly important in 1892, this seems to present no real problem to the analysis.

Table VIII:9 lists this measurement, best expressed as a percent of total post-Fire frontages, and the measurement of change in frontage length, for each of the five sectors of

TABLE VIII:9

CHANGES IN STREET PATTERNS AND LENGTHS

| Sector | Feet | % of Post-Fire | Pre-Fire | Post-Fire | % | Index |
|---|---|---|---|---|---|---|
| E | 2010 | 47.37 | 5030 | 4430 | -11.93 | -.1268 |
| F | 1120 | 28.43 | 3630 | 3940 | + 8.54 | +.0819 |
| G | 640 | 14.81 | 4440 | 4320 | - 2.70 | -.0274 |
| H | 3400 | 57.14 | 7460 | 5950 | - 20.2 | -.2252 |
| I | 1710 | 41.50 | 3880 | 4120 | + 61.8 | +.0600 |
| TOTAL | 8880 | 39.02 | 24440 | 22760 | - 6.87 | -.0712 |

Coefficient of Correlation (street-segment data)

Index of Change in Frontage Length

% New and Modified Frontage

r = .0328

the study area. This table makes very obvious the differences in extent of street modifications. The numbers also reflect differences in the type of modification, although these can be much more clearly seen in Map VIII:1.

As this table, and Table VIII:8 show, little change in frontage length occurred. With a few exceptions, most post-Fire street-segments had roughly the same frontage length as their pre-Fire versions, although there is a quite regular pattern of slight decreases. Yet, the city's rebuilders were faced with a considerable amount of new and modified frontages. This, along with the lack of any strong relationship between this variable and the change in frontage length, emphasizes what is apparent from the map: modifications were generally more in the nature of minor realignments than of complete revisions.

Despite this, the percent new and modified frontages does not seem to have had much of a relationship with the extent of redevelopment, at least not in its simple definition as change in the number of units ($r = -.1419$). Changes in frontage length, on the other hand, do appear to have had a modest relationship with this aspect of rebuilding. Most street-segments lost both frontage and units, and the size of the change in one is associated with the size of the change in the other ($r = .5122$).

Taken together, these results are yet another testimony to the strength of the tendency towards replication.

Map VIII:I

# A COMPARISON OF PRE- AND POST-FIRE STREET PATTERNS


Pre-Fire streets indicated by shaded areas
Post-Fire streets indicated by heavy lines

Modification of frontages would have presented both liabilities for redevelopment, and opportunities. Liabilities would occur wherever the new street line encroached upon the property -- as it did, for example, on the north side of Water Street (as shown in Sketch VIII:1). Here, street pattern modification would have made replication impossible, and therefore, redevelopment involved the nearly complete realignment and redesign of all structures. On the other side of the street, the straightening provided an opportunity for expansion. The sketch demonstrates two responses to this opportunity. One was to replicate the pre-Fire sidelines, but to extend the front up to the new street line, thereby increasing the size of the building. The other was simply to rebuild to the old street line, even though this left, in this admittedly extreme case, about 50 feet between the fronts of the new structures and the edge of the new streets[8].

Changes in the amount of frontage would also increase or limit opportunity. Decreases in frontage -- the usual case -- were typically directly reflected in decreases of units. Once again, in this rather weak sense, the hypothesized

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8. This pre-Fire street line can still be seen. Immediately behind the large building opposite the War Memorial is a building the north side of which lies on the pre-Fire building line of Water Street. The next building to the east of this, which fronts (at some distance) present-day Water Street is also built to the pre-Fire line.

influence of modification of street patterns on redevelopment is confirmed.

But new street frontage did not, as a rule, lead to new development. While this did occur on some segments, others, such as the new sections of Bond Street, were never developed to the extent which surrounding older streets were redeveloped. Furthermore, what little development did occur here occurred quite late. About half of these sections were still shown as undeveloped on the atlas sheet dating from 1914 and reprinted in 1925. While the extremity of this particular delay is probably not typical, it does underline the essential point that new building spaces were not always immediately seized upon, even where they might have seemed to present opportunities "intervening" between the commercial core and the growing residential district to the north of Military Road. Clearly, other factors than the simple modification of the street pattern must have been at work.

Nor does the modification of the street pattern contribute much to an explanation of the functional shifts which occurred in the study area. Neither variable shows anything but a very weak relationship with any of the variables expressing actual change in the number of units of a particular use-type, or with the variables expressing the degree to which these actual changes were the results of shifts in the mix of uses. (See Table VIII:10)

TABLE VIII:10

SELECTED CORRELATION COEFFICIENTS

| | Index of Unit Change | Index of Change in Residential Units | Index of Change in Consumer-Oriented Commercial Units | Index of Change in Non-Consumer-Oriented Commercial Units | Shift in Residential Units | Shift in Consumer Oriented Commercial Units | Shift in Non-Consumer-Oriented Commercial Units | Percent "Staying" Households |
|---|---|---|---|---|---|---|---|---|
| Index of Change in Street Frontage | .5122 | .2320 | .0791 | .1347 | -.2199 | -.2462 | -.1071 | .1918 |
| Percent Modified Street Frontages | -.1419 | -.3793 | -.0194 | -.1328 | -.1914 | .0710 | -.0597 | -.4271 |
| Percent Leasehold | .2068 | .2915 | .1034 | -.2136 | .1961 | .0353 | -.2760 | .7137 |
| Index of Fragmentation | -.5667 | -.5276 | -.3342 | .1965 | -.2163 | -.1545 | .3602 | -.6037 |
| Pre-Fire Density | -.5392 | .3188 | -.0462 | -.0565 | .6794 | .2984 | .1916 | .0513 |
| Pre-Fire Contiguity | .3382 | -.1064 | .1820 | -.0073 | -.3514 | -.0216 | -.1603 | -.0729 |
| Pre-Fire Uses Per Unit | .3403 | -.1818 | .2261 | .1602 | -.4060 | .0219 | .0035 | -.0620 |
| Location | .5464 | .3443 | .4113 | .2204 | -.1571 | .0901 | -.0423 | .4317 |
| Pre-Fire Percent Units Residential | .6364 | | | | | | | |
| Pre-Fire Percent Units Consumer Oriented Commercial | | -.6746 | | | | | | |

This suggests that, while decreases in buildable space may have resulted in the loss of units, the identity of those which were to be lost depended on entirely different factors. This is, of course, not at variance with the hypothesized process: that the least viable of uses would be those which would disappear, especially where competition for space may have been increased.

One of these other factors may have been the pattern of land ownership. As stated in a third major hypothesis, large blocks of land, under one owner, would have been redeveloped more quickly and more fully. But they might also have been areas where the modification of the street pattern was easiest. This, in fact, does not appear to have been the case. The more fragmented was the ownership of the property on a street-segment, the more likely it was to have a high percentage of new or modified frontage after the Fire ($r = .5050$).

Fragmentation of ownership was, however, related to change in the number of units. The more fragmented street-segments tended to have fewer post-Fire than pre-Fire units ($r = -.5667$). But the change in number of units and the type of ownership were not strongly related ($r = .2068$), despite the logical and statistical associations between levels of leasehold ownership and fragmentation

($r = -.5410$)[9]. In other words, at least in this part of the study area, the control of greater or smaller parcels of land was important, but not the legal devices under which land was held.

This may simply be an indication that the leasehold system in St. John's had, by the 1890's, already devolved into a *de facto* freehold system. This would certainly be similar to the current situation in St. John's, and perhaps more significantly, would be in strong contrast to the nineteenth century British system where landlords would typically have been unable to break their entailed estates into smaller properties. There is some evidence, in the complexity of ownership in some parts of the study area, especially in the block between Duckworth, King's, Gower, and Prescott, where a number of owners held properties under both types of tenure, that this was true. In addition, there was the process apparent in the comparison area where several small properties had been "chipped away" from the edges of the estates, into lots held either as freehold or -- what is almost the same thing -- under 999 year leases. In fact, some of these virtually perpetual leases involved nominal rents of one or two peppercorns a year.

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9 Fragmentation and change in units, controlled for by percent ground rent: $r = -.5528$.

In effect, the major consequences of freehold and leasehold ownership may have been to alter the owners' and occupants' tax liabilities. This, in turn, unless tenure arrangements were easily modified, would have considerably affected both development and redevelopment[10].

Nevertheless, fragmentation of ownership, particularly as it affects the assembly of land into buildable parcels, is a commonly accepted geographical variable. Its importance can be further emphasized by examining the effect of another commonly accepted variable, location, on change in numbers of units. Many of the comparisons made in Chapters V and VII suggested that distance from the harbour may have been a critical factor. And a locational variable does correlate quite highly with change in number of units ($r = .5464$). But controlling for fragmentaiton, with which it is nearly as highly correlated ($r = -.5272$), greatly reduces this correlation (to .2138).

Futhermore, controlling for the percentage of all units which were residential -- since this is also strongly associated with the locational variable ($r = .8347$) -- reduces this association between unit change and location

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10 This is an interesting question, but one beyond the capabilities of the data collected for this thesis. The necessary post-Fire data may, in any case, not be available, or be of insufficient quality. An attempt was made to collect it, and the attempt abandoned because the tax rolls in the period immediately after the Fire were so incomplete.

even further (to .0621), while controlling simultaneously for fragmentation and residential character virtually eliminates it (reducing the coefficient to -.0290). This is not to suggest that location was without impact, but only that its influence operated most strongly through the locational patterns of residential character and fragmentation of ownership.

Far more important than the change simply in number of units are changes in the numbers of different types of uses and in the mix of uses. It has been hypothesized that this is the result of the viability, at different locations, of different types of uses. One extremely crude way of looking at this -- and the only possible one given the nature of the data -- is based on the assumption that in areas where a particular use was especially competitive, there would be relatively little available building space (and in this context, too, many contiguous units). Furthermore, in locations where the competition for space was great, there would likely be more units used for multiple use.

If such assumptions are true, the data available do not support the hypothesis. Density does have an apparent association with changes in units, but this is merely the result of its further association with the percent of residential units. In addition, while it may be true that the more frontage per pre-Fire unit, the more likely was the index of change in the number of residential units to exceed

that for all units (r = .6794), or, in simpler terms, for the post-Fire percentage of residential units to be higher than the pre-Fire one, this only confirms the impression gained from visual comparison of the atlas sheets. In those few cases where available open space was used more intensively after the Fire than it had been before, it tended to be used for the addition of one or two residential units in already highly residential areas.

On the other hand, as hypothesized, there was a definite relocation of residential units away from the commercial areas of the waterfront. This is reflected in the association of the percent of consumer-oriented-commercial uses on a street-segment (a variable expressing what is basically the opposite of residential character) with the index of residential change (r = -.6746). The more commercial a segment before the Fire, the more likely was it to have even fewer residential units after rebuilding[11]. Finally, it was expected that any changes in population would have been closely related to the formal and functional changes already discussed. These population changes can be thought of in two ways: as changes in numbers of directory listings and households, treated as indices identical in form

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11 Fragmentation of ownership also shows an association with residential change; its influence, in this case, appears to be only through its association with rates of consumer-oriented uses.

to those previously used. An additional indicator, of residential stability, is the percent of pre-Fire households which can be identified as living on the same street after the Fire.

While strong correlations between the indices derived from the directory data and those derived from the atlas data need not exist, it was anticipated that the general patterns suggested by the two data sets would be similar. This did not prove to be the case. One reason for this is presumably the directory data's inclusion, and the atlas data's exclusion, of secondary uses such as the residence above a shop, or the second household in a residence. As it happened, some of the more residentially volatile streets were those where these kinds of multiple uses were most common. Pre-Fire Water Street, for example, is mapped as having only 9 residences, while the number of households indicated by the directory data is 60.

Another reason is that the directory data represents a much shorter recovery time, from 1892 to 1894, than does the atlas data, since the sheets were continuously corrected up to the date of the next atlas, 1914. A few streets, such as Cummings and Hanley, are mapped as reconstructed, although they do not appear in a post-Fire directory until 1904.

But, the directory data, used either as indices of change or as household stability rates, show no theoretically significant relationships to any of the hypothesized

explanatory variables. Fragmentation of ownership does have an apparent effect on rates of residential stability, suggesting that areas in which ownership was concentrated in a relatively small number of hands tended to have the most returning households ($r = -.6037$). While this is a plausible enough result, controlling this correlation by the percent of leasehold properties reduces the coefficient (to $-.2303$), indicating that this apparent influence of fragmentation was principally the effect of its strong relationship with patterns of tenure.

However, the rate of residential stability has a strong positive relationship with the percent of leasehold properties ($r = .71737$). On the face of it, this would indicate that, in areas where households would generally have had the least legal attachments to land and properties, they were the most likely to have returned. Yet at least one group existed with weaker ties: those households renting accomodations in structures owned by someone else. The number of these cannot be determined from the available data, but since freeholders, on average, owned 1.9 properties, it is reasonable to assume that upwards of fifty percent of all firms and households on freehold land within the study area were renters. Indeed, it is reasonable to assume that the percentage is a good deal higher than fifty, since this figure is based on data which almost certainly overestimate

the number of owners. Furthermore, while the tax rolls report on this matter too inconsistently to allow any precise count, it is apparent that a significant number of freeholders did not themselves occupy any of their properties in the area. In addition, many houses on leasehold land were also rented.

In other words, one cannot simply assume that households on leasehold land were, as a group, less (or more) attached to the land than were households on freehold land. But it is still unclear why those from areas with high percentages of ground rentals were those most likely to return to their pre-Fire streets. Such streets were also associated with stability (or with only very modest changes in numbers of listings and households -- for the smaller estimate of listings, $r = .6525$; for the larger, $r = .5520$; for the smaller estimate of households, $r = .7153$; for the larger, $r = .6008$). But the association of tenure type with the change in the number of residences was quite low ($r = .2915$). If we assume this difference in the pattern of results is due to the difference in time of the measurements, it is possible to interpret it as an indication that ground leased areas were not so much more fully redeveloped, as redeveloped more quickly.

Although the available data precludes any complete investigation of this hypothesis, a number of possible reasons can be suggested. First, it is true that ground

lords had both the ability and the incentive to offer potential builders certain guarantees about the nature of redevelopment on adjacent lots, and to make adjustment to property lines (if required by street modifications) more quickly. However, if this were the only, or even a principle, factor in the apparently faster return of residents to these areas, the correlation with fragmentation should be even greater than it is.

Another possible explanation is differential tax rates. A common accusation in the newspapers of the time was that one of the tricks of the ever-unscrupulous absentee landlord was to use the ground rent system as a method of evading his rightful share of taxes. (The newspapers, alas, report invective only, and nowhere appears any firm evidence to back up this claim. But one interpretation of the 999 year leases of the study and comparison areas is that they were specifically designed as tax dodges.) In any event, given parcels of land identical in all respects except their tax liabilities, it is likely that those least taxed would be first developed.

A further difference in the development of freehold and ground leased properties was that leasing land held down the total immediate cost of the structures to be built. This could presumably be important if one group of households -- the freeholders or those who hold ground leases -- were on the whole better off, or had more liquid assets, than the

other. Without pursuing this point, there is little evidence to believe either would be true, although it is possible that ground lords, especially those absentee groundlords with investments in other parts of the world, would have been least hurt financially, and might have been willing to make certain concessions to potential rebuilders in order to speed the redevelopment of their land.

This flies in the face of those post-Fire politicians who cursed the gouging landlords for cruelly displacing hundred of families. Certainly, given the quantity of land available both before and after the Fire, property owners were not in the best position to gouge anyone, except for those few firms with very specific locational requirements, such as proximity to the Harbour. We may doubt the politicians on one count: at least in the study area, the number of households which returned to their old streets is, as we have already seen, remarkably high.

Even if this rather tentatively presented hypothesis -- that groundlords tended to be willing and able to make concessions in order to speed development -- is valid, the question of why the returns of households to leaseheld streets should be greater than it was to others remains unanswered. Clearly, factors well beyond the scope of this analysis must be invoked if this aspect of residential

stability is to be understood[12].

Nevertheless, this analysis has pointed out some important aspects behind the redevelopment of the study area. Without diminishing the significant role of the street, and of changes in its frontage, as a strongly operating constraining factor, the greatest influences seem to have been the degree of fragmentation of land holdings, rather than the type of ownership, and the residential and commercial character of the district. In an area which in many ways very thoroughly replicated itself, these can be seen as the major factors behind reconstruction and change.

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12 An important aspect is the extent to which ground lessors and lessees remained contractually obligated to each other after the destruction of the improved property involved. A second one is the question of which party had the greater legal and financial advantage.

# IX. SOME CONCLUDING REMARKS

> . . . in virtually all recent scholarly work there is agreement on certain fundamental points. It is obvious, for example, that a city's site, its buildings, the early surveys and divisions of land, and the original location of residential, institutional, and commercial districts impose a measure of permanence on the form of a community.
>
> Alan F.J. Artibise and Gilbert A. Stelter, The Usable Urban Past (1979: 2)

The preceding chapters have attempted to show the influence of several factors upon the rebuilding of a late-nineteenth century North American city after its destruction by a catastrophic Fire. In order to do this, it was first necessary to describe the city as it was both before and after the Fire, and also to examine in more detail two small sub-areas of that city. Only by placing the city and these areas in the context of their times was it possible to use our knowledge of them as the "initial" and "final" states from which the processes of redevelopment can be inferred.

The descriptions and other materials presented in Chapters V and VII show St. John's, both before and after the Great Fire, to have been, in Warner's terms, a "walking" or "pedestrian" city. In the terms of this thesis, it was a "small" city, and one well within its "ideal" area.

As a "small" city, St. John's should not have been expected to be either densely populated or densely built-up. This, at least within the study and comparison areas, appears to have been true, as does the related expectation of a gradual diminuation of density with distance from the harbour which served as its core.

The harbour was considered as a key to the functional differentiation of the city. The principal economic functions -- import and export trades, and related wholesaling and retailing activities -- would obviously have required a waterfront location. It was hypothesized that this, in turn, would have created certain peripheral localizations. As demonstrated, these localizations included the consumer- and non-consumer-oriented commercial uses of the major study area streets. The first of these uses decreased gradually, and the latter more rapidly, as distance from the harbour increased. The necessary corrolary was an increase in residential functions with increasing distance from the harbour.

Another, although less important, key to the city's functional differentiation was the apparent desirability of residential locations near the House of Assembly, the Governor's mansion, and the parklands surrounding these political establishments. Whatever the reasons behind this localization, it is clear, in both the study and comparison

areas, that higher "class" residential uses tended to gravitate towards these sites.

Functional differentiation was, however, far from complete. Residential uses could be found throughout the areas studied, both before and after the Fire. Even the major commercial streets provided considerable housing, often for persons connected in some way with their street's commercial uses. Conversely, there were few residential streets, except for some of the very highest and lowest "class", which were entirely devoid of commercial uses. Many of these were the shops or small manufactories run by persons working out of their own homes, but there were also a few larger enterprises. Thus it is apparent that, as hypothesized, few people needed to travel very far to work, and that on most streets, it was possible to find the basic necessities of food and drink.

In addition, these findings support a general assumption of a pattern of differentiation based on economic functions, expressed as land uses, and social functions, expressed as occupational distributions. Where people lived does seem to have been very much determined by what and where their jobs were, and that, in turn, to have been very much determined by the nature of the goods and services produced in these jobs.

Another aspect of the occupational distribution was particularly well illustrated in the pre-Fire study and

comparison areas. The available data made possible a fairly distinct typing of streets by social "class". Of particular interest was the hypothesized pattern of almost exclusive occupance of interior streets by persons with lower "class" jobs, while other streets tended to have more persons with middle and upper "class" ones.

The streets of the post-Fire areas could not be so distinctly typed. To a large extent, this was the result of inferior data. However, it does appear probable that the social patterning of these areas had, in fact, become less distinct, quite possibly because of the mobility induced or accelerated by the Fire.

This is but one of the differences discovered between the pre-Fire and post-Fire areas. Other differences, such as a general shift in the mix of functions, have been documented for the two areas, while still others, such as differences in building style, have been mentioned in reference to the city as a whole.

While these changes are interesting in themselves, they also provide some evidence for a hypothesis which could not otherwise be tested in this study. This is the assumption that where the pre-Fire form and function had been beneficial -- in the sense that they had provided their owners and users with acceptable levels of either (or both) profit and amenity -- the rebuilding would have replicated, or at most, made

only slight improvements upon, what had existed before the Fire. It was found, especially in the waterfront area, that considerable changes were made in building sizes and configuration, and more minor changes in the orientation of buildings to streets.

Despite these changes, the post-Fire city, and the two areas studied in more detail, were remarkably similar to those that had existed before the Fire. The late-nineteenth century character of St. John's, both before and after the destruction and reubilding of its greater part, was that of a "small" city, with its economic and social patternings strongly dependent on its role as a port and a centre of government, and was quite typical of other small port cities of its time and culture.

It was atypical in one sense. Only a few other North American cities relied upon leasehold systems of land tenure to the extent that St. John's did. The impact of this on its urban form does not, however, appear to have been great in either the study or the comparison area -- at least not in the terms of the handful of morphogenetic aspects discussed in this thesis. Nor did tenure <u>type</u> appear to have had a great impact on the recreation of that form after the Fire. The <u>fragmentation</u> of ownership, on the other hand, does seem to have affected redevelopment, as the more fragmented streets tended to be those less completely rebuilt.

Paradoxically, tenure type was strongly associated with residential stability. Those streets with the highest percentages of ground rentals were those where households proved most likely to have returned, and where changes in numbers of listings and households proved to be least. This paradox is assumed to be the result of ground leased area -- perhaps because these tended to be those least fragmented -- being both the most quickly and the most completely rebuilt.

Several other factors were hypothesized as being important constraints on the process of redevelopment. One of these was the effect of the pre-existing street pattern. More specifically, it was hypothesized that post-Fire modifications of the street pattern would have influenced the process of redevelopment, and that this would have been reflected in changes in the numbers and mixes of uses. However, it was demonstrated that the modifications of streets, in the sectors of the study area, did very little to explain those functional shifts which had occurred.

It was also shown, in looking at the modification of individual street-segments, that where these were much altered, changes in other morphological aspects, like the numbers, and the arrangements of units on the ground, were necessarily also altered. Conversely, unaltered or moderately altered streets resulted in little further change. This may be interpreted as showing one constraining effect of

the street system. Or, it may be interpreted as showing the constraining effects of other variables, acting simultaneously on street patterns and these other aspects of change.

The power of government was clearly one of these "other variables". So was the ownership of land, especially as it was responsible for different degrees of fragmentation. And finally, there were the economic needs of the city.

If a city's morphogenesis can be thought of as a series of processes resulting in ever more intricate interconnections between its different aspects, then its catastrophic destruction does not result in a tabula rasa, simply because so many of these interconnections have no destructable physical entity. Ownership of land (including the public ownership of streets) must be one of the most important of these, and this can only be altered by political or economic means. Both, as we have seen, were used in St. John's: the former, as it happened, perhaps more so than in other catastrophically destroyed cities. But both can also be used, if with rather more difficulty, in non-catastrophic times. The catastrophe does not remove constraints, or even weaken them; what it does is weaken the mutually supporting relationships between them, thus making economic or political modifications less difficult.

* * *

In preparing this thesis, a number of areas of inquiry have been laid bare, briefly explored, and then, because they did not fit the design or purposes of this work, abandoned. A major area has been the influence of tenure patterns. Since the effect of the ground lease system on this small, North American, city could be compared with its effect on larger, British, ones, this is a potentially very rewarding field of research. The best method of attack would probably be to reconstruct the developmental history of a number of St. John's estates, and some freehold properties, from their initial creation to some more recent point in time. An essential side issue would be a determination of the changing legal status of the two types of ownership.

Another major area of inquiry is the pattern of households and firms after the Fire, in comparison to similar relocations in subsequent years. This would require a somewhat more sophisticated handling of data than has been possible in this thesis. Following procedures developed for the study of other cities (for example, Hamilton, Ontario and Philadelphia, Pennsylvania), each directory could be computerized, as could be the tax rolls. This would provide a data base for the entire city, which could begin as early as the mid-nineteenth century. Other data might well be available through church and similar records, and, if these could be made available, certain manuscript censuses.

This data bank could then be used to examine many other questions of geographical and historical interest. There are questions dealing with the relocation of firms and households, with the shifting (or stable) location of the central business district, of various ethnic enclaves, of certain economic groups. Such data, carried over enough years, could also provide time-series for the study of the growth, and stability or decline, of residential, commercial, and other, areas.

The atlas data might also be used in more sophisticated ways. An interesting research project would involve the careful stripping away of the correcting stickers on the maps of various dates -- a sort of paper archaeology! It would also be useful to test both the Whitehand family of models, and certain hypotheses about the impact of the Fire on unburnt areas, by comparing these areas' pre-Fire structures to their post-Fire ones. Valuable variables might include size and shape of lots; size, shape, and orientation of buildings; and nature of use. In this context, too, an investigation of the purported "planning" of Georgestown as an alternative to the older part of the city would be appropriate. While much of this research would be archival, some use of the techniques of oral history might still be rewarding.

The insurance atlases could also be used as the base for a study of the morphological impact of land withheld from development, especially as such parcels act as reserves for future development.

There are, finally, a number of questions perhaps less uniquely within the scope of geography. Do, for example, political documents, such as zoning plans and bylaws, heritage preservation districts, and building and maintenance codes, tend to "institutionalize" constraints -- giving even greater strength to their mutually supporting interrelationships? Or, are very large projects, because they go against the historically more common process of piecemeal modification of urban form, more likely to have serious effects on their neighbourhoods, and on the resulting quality of urban life?

These questions, even if unanswerable here, demonstrate the necessity for a fuller understanding of urban morphology and morphogenesis. It is the built environment of a city -- its bricks and sidewalks, its homes, shops, and factories, its streets and neighbourhoods, -- that best express the quality of its life. And understanding this environment, particularly the forces which created it and those which would alter or maintain it, is a fundamental need of our times, both for the planning of our cities' futures, and our appreciation of their pasts.

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## APPENDIX A

### A1 SELECTED DATA FROM THE CENSUS OF NEWFOUNDLAND AND LABRADOR, 1891

| | St. John's East* | St. John's West* | % Total in East |
|---|---|---|---|
| Population | 15347 | 13660 | 52.9 |
| Clergymen | 23 | 9 | 71.9 |
| Teachers | 100 | 35 | 74.1 |
| Lawyers | 37 | 5 | 88.1 |
| Doctors | 16 | 1 | 94.1 |
| Merchants & Traders | 106 | 96 | 52.5 |
| Office or Shop Workers | 742 | 328 | 69.3 |
| Engaged Solely in Government Service | 225 | 43 | 84.0 |
| Farmers | 152 | 195 | 43.8 |
| Fishermen & Others Who Cultivate Land | 22 | 15 | 59.5 |
| Mechanics | 954 | 835 | 53.3 |
| Males Engaged in Catching & Curing Fish | 127 | 278 | 31.6 |
| Females Engaged in Curing Fish | 4 | 1 | 80.0 |
| Lumbering | 0 | 0 | -- |
| Mining | 1 | 3 | 25.0 |
| Factories or Workshop Workers | 121 | 339 | 26.3 |
| Otherwise Employed | 1537 | 1492 | 50.7 |
| Total Employed | 4167 | 3675 | 53.1 |
| Churches | 8 | 7 | 53.3 |
| Schools | 19 | 18 | 51.4 |
| Number of Scholars That Can Be Accomodated | 3680 | 1723 | 68.1 |
| Inhabited Houses | 2474 | 2062 | 54.5 |
| Families Inhabiting | 2993 | 2686 | 52.7 |
| Average Family Size | 5.13 | 5.09 | -- |
| Persons per House | 6.20 | 6.62 | -- |
| Families Per House | 1.21 | 1.30 | -- |
| Factory Buildings | 13 | 32 | 28.9 |
| Mercantile Premises | 33 | 35 | 48.5 |
| Houses Now Building | 19 | 5 | 79.2 |
| Built in Last Year | 13 | 2 | 86.7 |

*These districts, the smallest for which data are available, are essentially the East and West Ends, defined by the census as "city and suburbs", east and west, respectively, of Beck's Cove. While the districts undoubtedly do include some non-urbanized areas, they do not include independent villages (eg. Quidi Vidi) on the outskirts of the city. Note that the population for "St. John's within the limits of the Municipal Act" was estimated in the census as 24,823--or about 85% of the larger area. In the absence of detailed maps, it is impossible to determine where the extra 15% were, although other evidence suggests many were in built-up areas more or less contiguous to the city proper's built-up areas.

## A2. SELECTED DATA FROM THE CENSUS OF NEWFOUNDLAND AND LABRADOR, 1901

| | St. John's East* | St. John's West* | % Total in East |
|---|---|---|---|
| Population | 14741 | 15860 | 48.2 |
| Clergymen | 25 | 11 | 69.4 |
| Teachers | 86 | 39 | 68.8 |
| Lawyers | 42 | 10 | 80.8 |
| Doctors | 23 | 3 | 88.8 |
| Merchants & Traders | 196 | 42 | 82.3 |
| Office or Shop Workers | 544 | 559 | 49.3 |
| Engaged Solely in Government Service | 217 | 101 | 68.2 |
| Farmers | 119 | 79 | 60.1 |
| Fishermen & Others Who Cultivate Land | 1 | 10 | 9.1 |
| Mechanics | 953 | 1106 | 46.3 |
| Males Engaged in Catching & Curing Fish | 3 | 82 | 3.5 |
| Females Engaged in Curing Fish | 0 | 19 | 0.0 |
| Lumbering | 2 | 2 | 50.0 |
| Mining | 4 | 5 | 80.0 |
| Factories or Workshop Workers | 31 | 268 | 10.4 |
| Otherwise Employed | 1839 | 2184 | 45.7 |
| Total Employed | 4085 | 4520 | 47.5 |
| Churches | | | |
| Schools | 19 | 15 | 55.9 |
| Number of Scholars Than Can Be Accomodated | | | |
| Inhabited Houses | 2364 | 2466 | 48.9 |
| Families Inhabiting | 2988 | 3159 | 48.6 |
| Average Family Size | 4.9 | 5.0 | -- |
| Persons per House | 6.2 | 6.4 | -- |
| Families per House | 1.3 | 1.3 | -- |
| Factory Buildings | 5 | 35 | 12.5 |
| Business Premises | 35 | 131 | 21.1 |
| Houses Now Building | 15 | 33 | 31.3 |
| Built in Last Year | 5 | 26 | 16.1 |

*See note to A1. Note also that the 1901 population for "St. John's within the limits of the Municipal Act" was estimated in the census as 28,548 (or 29,594, if the South Side is included). These figures are about 93% (or 97%, including the South Side) of the larger area.

## APPENDIX B

## NOTES ON THE EXTRACTION OF DATA FROM THE INSURANCE ATLASES

### Use data

Many of the structures shown on the insurance maps contain a symbolic or verbal indication of their use: for example, an "s", indicating a shop or store, or a phrase, such as "furniture showroom". In order to make use of this information, a number of categories had to be created. These were designed so that, in most cases, the assignment of units to categories of use was straight-forward. However, a certain amount of interpolation was required in some cases.

For counting purposes, nine categories were developed. The largest of these, "residential", contains only those units which had no use noted. Other categories contain only units with a specific symbol, such as the "s" for shop or store. A final set of categories contains units for which some judgement was required. Sometimes, the decision was quite simple -- a hotel belongs, without question, in the category "food, drink, or lodging", while an insurance agency is clearly an "office".

In some instances, the decisions were more difficult. This was particularly the case when classifying certain commercial or light industrial units into categories which reflect whether or not these units held uses which were consumer- or non-consumer-oriented. In making a decision of

this type, the apparent scale and nature of the enterprise, as shown by the physical characteristics of the structure containing it, were taken into consideration.

The ten categories were further grouped into four major aggregations. These are listed below, along with notes on their contents.

Purely Residential:

Residential: These units were probably almost entirely residential, although a few cases may have held other uses. Inclusion in this category was determined by the absence of any indication of other use.

Consumer-Oriented Commercial:

Shop or Store: Inclusion was by map symbol.

Provider of Food, Drink, or Lodging: Inclusion was by map symbol, and groceries were not considered as part of this category.

Provider of Other Goods and Services: Inclusion was by map notation, and groceries were placed in this category.

NOTE: Although it is impossible to tell by the information presented on the atlas sheets, it is highly probable that many of the units included in this aggregation also held residential uses.

Non-Consumer-Oriented Commercial:

Factory: Inclusion was determined by map notation, and by author's judgement.

Office: As above.

Warehouse: As above.

Other:

Public: These are buildings such as churches, skating rinks, and fire halls. Inclusion was by map notation, with some judgement exercised in the case of public offices.

Stable: Only very large private and commercial stables appear to be indicated by the map notation. Inclusion was determined by notation.

Miscellaneous Outbuildings: Small buildings such as storage sheds, conservatories, small stables, and the like. This were indicated on the map by a light tint. Inclusion was by notation.

Unit size and area data

Rather than attempting to determine the size and area of each of the more than 2000 pre- and post-Fire units, a sample was taken. This sample was stratified proportionally according to sector, and non-proportionally according to use, with the percentage sampled varying from use to use. The sampling percentage was chosen in consideration of the apparent variability within sectors of the data desired, and the size of the population. Table B:1 lists this information, while Table B:2 presents an example of the stratification used.

Within this structure, units were chosen from an ordered set of all units of a particular type within a particular

TABLE B:1

SAMPLING BREAKDOWN: NUMBERS AND PER CENTS SAMPLED

| Sampling Category | % Sampled | Pre-Fire No. of Units | Pre-Fire Sample Size | Post-Fire No. of Units | Post-Fire Sample Size |
|---|---|---|---|---|---|
| Residential | 10% | 753 | 76 | 671 | 67 |
| Shop, Store, and Provider of Other Goods or Services | 10% | 136 | 13 | 144 | 16 |
| Provider of Food, Drink or Lodging | 50% | 18 | 10 | 16 | 9 |
| Factory | 100% | 26 | 26 | 27 | 27 |
| Office | 50% | 9 | 5 | 10 | 6 |
| Warehouse | 30% | 38 | 12 | 39 | 12 |
| Public | 100% | 13 | 13 | 10 | 10 |
| Stable | 30% | 38 | 11 | 54 | 16 |
| Miscellaneous Outbuildings | 10% | 81 | 7 | 33 | 4 |
| TOTAL | | 1112 | 173 | 1004 | 167 |

TABLE B:2

SAMPLING BREAKDOWN: THE EXAMPLE OF PRE-FIRE RESIDENTIAL USES

| Sector | Actual Number | Number in Sample |
|---|---|---|
| A | 52 | 5 |
| B | 66 | 7 |
| C | 41 | 4 |
| D | 36 | 4 |
| E | 136 | 14 |
| F | 81 | 8 |
| G | 143 | 14 |
| H | 115 | 12 |
| I | 83 | 8 |
| TOTAL | 753 | 76 |

sector by using a table of random numbers. These units were then measured from copies of the insurance atlas. Measurements are considered accurate to the nearest five feet.

For sampling purposes, "shops" and "providers of other goods and services" were combined. Because this is not, strictly speaking, a completely random sample, both because it was taken without replacement, and because it is stratified, the efficiency of the usual statistical procedures is somewhat weakened. Given that this data is used in only a very limited way, and the very small number of sectors (nine), this problem can be safely ignored.

Appropriate weights were used whenever aggregations across types were made.

Street and frontage length data

Street and frontage length were determined by measurement from copies of the atlas sheets. The measurements were taken between discrete points, such as the ends of blocks, or bends in the streets, and included all frontages and intersections. Where a street ended at an intersection, one half of the width of the crossing street was included in its length.

Street length was calculated by summming all frontage and intersection measurements, and dividing by two. In a few cases, where this would have introduced serious errors,

slight modifications of this procedure were used. This most often occurred where a street broadened out into a "square" (such as British Square or at King's Beach). In these cases, the direct distance across the area was measured and used in the calculations.

Frontage length was calculated simply by summing all frontage measurements.

Measurements are considered accurate to the nearest ten feet.

Sector area data

This was measured from copies of the insurance atlas sheets by using a uniform grid overlay. Squares were counted, and from this number, an estimate of area derived. Each grid represented 1111 square feet (or 1/3 of 100 feet squared).

## APPENDIX C

## NOTES ON THE EXTRACTION OF DATA FROM THE DIRECTORIES

In comparison to that of the insurance atlas data, the extraction of the directory data was conceptually simple, but extremely time-consuming. The directories used list firms and persons by alphabetically arranged surname, not, as some more modern ones do, by street and street number. This meant that each directory had to be read through completely. Any listing with a study or comparison area street name was copied onto index cards. Having compiled this raw data bank, the listings had then to be aggregated into useable geographic units, and into theoretically meaningful categories.

In order that comparisons between the two periods could be made, the size and definition of the geographical units had to be determined by the "worse" -- or the less detailed -- directory. This was usually the 1894, which frequently does not include the street number in its listings. Thus, the smallest possible unit of aggregation was the street. Of these units, there are thirty-one. Most consist of a single street, although a few consist of a street plus adjacent lanes or alleys. One very large unit is made up of all the

listings for the interior of one block.

The absence of street numbers in the 1894 directory resulted in another problem. There were six streets -- Military, Queen's, Bond, Gower, Duckworth, and Water -- which extended well outside of the areas studied. A not unrelated problem was caused by the three streets -- James, William, and Queen's -- which had names similar to, or identical with, the names of streets in other parts of the city. Similarity of name, let alone identity, was enough, given the vagaries of spelling in these directories, to make it impossible to be certain whether a listing for these streets belonged in the areas studied or not. This was, of course, the same problem that arose for listings on streets that ran outside of the study area.

One solution to this problem was to estimate the true set of listings by eliminating or including members from the set of all listings by references to additional data sources,

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1 This is the block bounded by Duckworth, King's, Gower, and Prescott, and is the one case where the "worse" directory is the 1890. This area, which the author has referred to as the Great Mess (or sometimes the Lesser Wen) was, before the Fire, a complex of alleys, some named, some not, and some named more than once. The compilers of the directory seem to have found it confusing, while the compilers of the tax rolls more or less ignored it. There is no sensible breakdown smaller than the one used. The area was, incidently, completely reorganized after the Fire, thereby eliminating another set of clues for the mental reconstruction of its pre-Fire state.

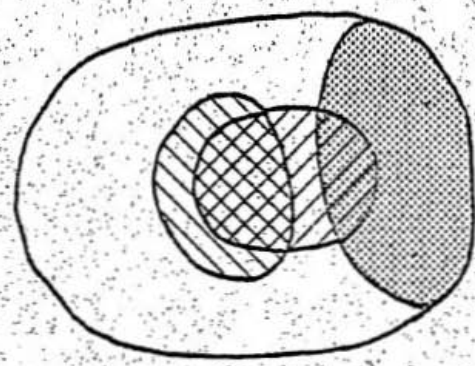
such as the 1891 tax rolls, and by the cross-referencing of the 1890 and 1894 directories. Unfortunately, both of these procedures, as will be seen, involve assumptions which prejudge the results of any analysis of mobility using this data.

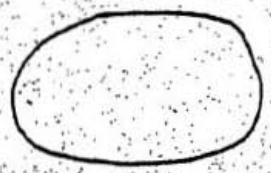
A partial corrective was the use of two estimates. One estimate is the set of listings created by eliminating from the set of all listings those members which the evidence strongly suggested were outside the areas studied. In making this estimate there was a slight risk that some of those eliminated ought not to have been, but a much greater risk that some who should have been eliminated were not. It is, furthermore, very likely much larger than the true set. A second set was estimated, including only those listings which the evidence strongly suggested were in the areas studied. This estimate is very likely much smaller than the true set, but probably includes only a few who should not be included. Figure C:1 should make these relationships clearer.

The first, or larger, estimate has a definite, and probably quite substantial, upward bias. The second, or smaller, has an equally definite downward bias, although this is probably only substantial in the case of the estimates needed for the six "over-extended" streets. However, no improvement in these estimates was possible without seriously jeopardizing the results of the analysis.

## Figure C:1

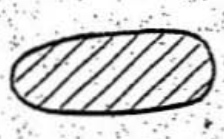
## THE SETS OF LISTINGS





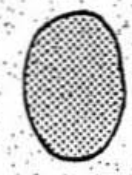
A

Set of all listings



B

Set of all true listings: i.e. the unknowable set of listings actually within the areas studied



C

Set of included listings: the smaller estimate

D

Set of eliminated listings: the larger estimate is set A less set C

The extent of prejudgement involved can best be seen by examining the procedures and assumptions used in the elimination or inclusion of a listing. Take, for example, the case of James Street. In this instance, some addresses do include the words "Georgestown" or "Monkstown" -- traditional names for a part of the comparison area -- and so can be unequivocally included. This, and the fact that James Street, Georgestown was renamed Mullock Street in time for the 1894 directory were of use in making the estimations.

First of all, any person listed as living on an unidentified James in 1890 was eliminated if they, or an apparent family member were listed in 1894 as on the other James or on a renamed section of a small street also called James in 1890. Those not eliminated form the larger set. The smaller set includes all who had "Georgestown" or "Monkstown" as part of their addresses, all who had the same or similar surname as the occupant of the same or similar address in the tax rolls, all who were listed at the same or similar number in 1894, and all who appear to be residents of

the same households as someone in one of the above categories.[2]

Now, a close rereading of the preceding paragraph will reveal a number of unstated assumptions and unexplained procedures. First, the spelling of names, even as late as the end of the nineteenth century, was still highly idiosyncratic. "Similar" as used above suggests differences of the order Flannery/O'Flannery and even of Galway/Gallishaw. (Similarity of occupation was sometimes used as supporting evidence.)

Second, street numbers were still a little imprecise, a problem compounded by typographical errors in the directories. "Similar" in this context means plus or minus two, unless other evidence suggests systematic renumbering.

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2 William Street was handled similarly. The larger set includes all who were not eliminated by reference to another directory year, the smaller all those specifically identifiable as Georgestown addresses.

Queen's Road, in 1890, proved less of a problem. The small section of this road in the study area was usually referred to as Delahunty's Lane. An initial classification, along the same lines discussed above, suggested that using only those listings identifted specifically in the directory as Delahunty's presented virtually no risk of over- or under-inclusivity. As a result, this was the procedure followed.

Military Road, on the other hand, also had to be divided into north and south sides -- because it separates the study area from the comparison area. Unnumbered households and listings were simply placed arbitrarily: half to one side, half to the other.

And, finally, "apparent" in reference to membership in the same household or family is used when persons from one directory year can be grouped because of identical or very similar names (eg.: Green/Greene), at identical street numbers.

Obviously, using the same or similar location in two directory years as a means of resolving data problems is a dubious procedure if the data is to be used in an analysis of mobility. But some much more subtle biases may have been introduced in making decisions as to the similarity of names and addresses. For example, the better-educated, who were usually the better-off, tended to have more distinctive names, which they spelled more consistently, and to have more distinctive occupations. There is but one listing for "Terrance Halloran, master mariner", but many for "Patrick Walsh, labourer".

The better-off also tended to live on more stable streets, although the very rich tended to live in places identified only by names -- Thornlea Cottage or Avalon House -- making accurate location sometimes impossible. Parts of Rennie's Mill and Circular Roads, the wealthiest sections of the comparison area, were as impossible to reconstruct as was the worst slum of the study area.

If, as it would be quite reasonable to hypothesize, class differences resulted in differences in mobility, then these comments become important caveats. And certainly,

similar caveats could be required for the tests of many hypotheses involving this data. Are, for instance, Irish names more difficult to match than English ones? Or, are houses on streets with more vacant lots more likely to be renumbered?

The assumptions become much less subtle, but even more daring, in the case of the streets which extended outside of the areas studied. Here, those eliminated to form the larger estimate are all those firms and individuals who could be identified, in both the 1890 and the 1898 directory, at the same or similar address on the street in question, but outside the areas studied. In eliminating these, the assumption was made that a move from one address to another was seldom followed by a move back to the first. A similar assumption was used to include all those listings at a same or similar address, and within the areas studied, in the two directories.

Because of the possible biases introduced into the data by either of these estimates, and because both prejudge the data, <u>both</u> estimates have been used in the analysis. This may be somewhat tedious for the reader, but it does give a better picture than either estimate used alone. Comparing the two will also give a rough indication of the importance of any bias introduced into either, and should serve to point out instances where the problem of prejudgement is so severe as to invalidate the results.

Given the two finished data banks of pre- and post-Fire listings, the next step was to aggregate them into addresses and households. An "address" was defined as a street and street number, and all listings with the identical address were grouped as one. Listings with street names but no number were ignored.

From a set of addresses, "households" were determined simply by counting the number of same or similar surnames (excluding those of domestics) at each address, plus any groups of same surname not at any complete address. Any listing without a street number but with a counted surname was considered as in that surname's household. (Note that this does not affect the count.)

The accuracy of these groupings clearly depends upon most listings having complete addresses. As mentioned, this was not the case with the post-Fire directory. While households could be counted using the procedure described above, a third aggregation, labelled "grouped listings" had to be developed. This surrogate for addresses consists of any known addresses plus all grouped surnames not at an address. It is not, of course, appropriate to compare this variable to either pre-Fire addresses or households.

Having created these groups, and notwithstanding the problems previously discussed, these were used in a limited analysis of mobility patterns. Households were classified as "stayers" if one or more member had the same or similar

surname at a same or similar address in both directories, and "movers" if this was not true. (Note that this matching involved many of the same problems discussed in reference to forming the smaller estimate of listings.)

If the preceding material suggests that the problems with the directory data -- especially that from the 1894 one -- were so great as to render their use inappropriate, reassurance is available. In most cases, the inclusion or exclusion of a listing -- from the estimates, from an address or household, from a "moving" or "staying" household -- depended on more than one bit of information. There were many corroborating clues. And if some of these were too vague to have been of real use in the classifying procedures, all of them together were clear enough to assure the author of the validity of the classification.

APPENDIX D

NOTES ON THE USE OF AN INDEX OF CHANGE

In analyzing some aspects of the pre- and post-Fire city, an index based on the mean value of the variable at each of the two periods has been used. For example, changes in street length have been expressed as

$$\frac{\text{post-Fire length} - \text{pre-Fire length}}{1/2\ (\text{post-Fire length} + \text{pre-Fire length})}$$

This index has been chosen for a number of reasons, which can be classified as either paradigmatic or practical.

Paradigmatic: At first glance, it would seem that the simple rate of increase or decrease -- ie:

$$\frac{\text{post-Fire length} - \text{pre-Fire length}}{\text{pre-Fire length}}$$

-- would be best. But while this may be the simplest, and the most standard, it implies a number of assumptions which may not be appropriate to this thesis. The simple rate refers to change between two points in time, whereas the index is used as a method of approximating the line assumed to run between these two points. The distinction between these two measures can be regarded as the distinction between the measurement of an historical result, and the measurement of an historical process.

In the case of changes like those in street lengths, the process would normally be one of extremely slow (or no) modification, while something like units of use could be

expected to change somewhat more rapidly. The Fire, in terms of the hypotheses presented in this thesis, temporarily accelerated the rate of changes in street lengths, while causing a very rapid negative change in numbers of units and a subsequent, but again temporary, acceleration in the rate of growth.

In measuring these changes as results, it may be appropriate to think of the points in time as representing, respectively, an initial and a final stage. It may not, however, be appropriate to think of either point as representing a state of equilibrium, or of either point being "more" in equilibrium than the other. If equilibrium is defined as a situation in which no one who has any power to change his situation or behaviour wishes to do so, then both points are presumably equally in equilibrium. In fact, in terms of this thesis, where the Fire is assumed to have allowed many to make exactly these kinds of changes, it could be argued that the post-Fire period is to be considered "more" in equilibrium. And this is an argument which could be extended to justify the selection of the post-Fire value of the variable as the divisor!

In measuring the process, however, the two points in time are regarded merely as the tools used in the estimation of a real, but unknowable, line. Ideally, it would be useful to have considerably more than two points, but no others are available. The estimate of the line is, admittedly, accurate

only insofar as the real line is reasonably straight (although it need not be particularly smooth, or even continuous). In Figure D:1, the goodness of the estimate varies from perfect to very poor.

Given the nature of the things measured -- lengths of streets, numbers of buildings, etc. -- straightness (and smoothness) are clearly very likely, except, in some cases, in that short section of the line which represents the several hours of the Fire, and the immediate aftermath. For example, the graph of the numbers of buildings on a burnt street might look something like the one shown in Figure D:2.

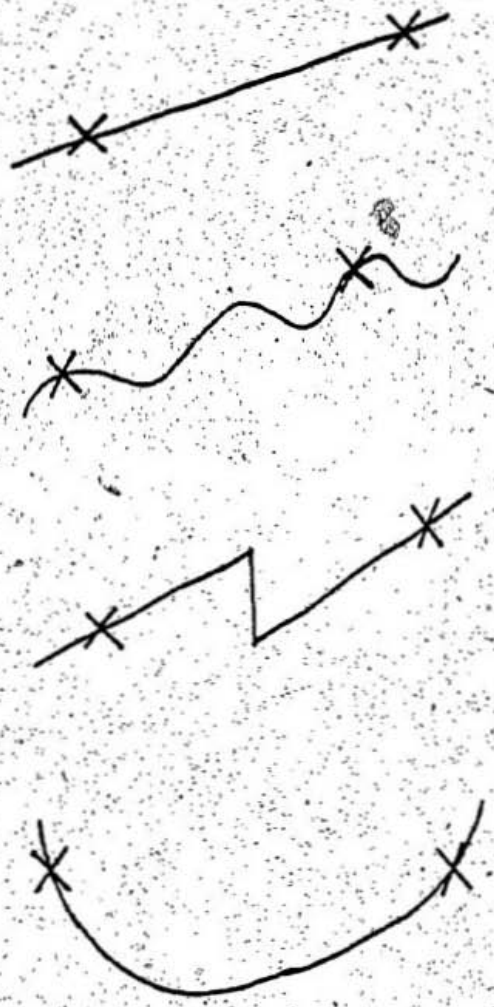
Where both segments (pre- and post-Fire) of the real line are moving in the same direction, the estimate of the line is always sufficiently good for its intended use. It is less good in all other situations, but no worse than would be, in this context, the simple rate of change.

Practical: Allusion has already been made to one of the practical considerations. The choice of any base is arbitary; the choice of the mean is no less so, but, at least, it avoids choosing between two of equal worth. (Note: this is not true if we desire a measure of historical result; clearly, in that case, the pre-Fire variable is the base to be used.)

A not unrelated consideration is that in examining a process, it is convenient to have a measure which treats

## Figure D:1

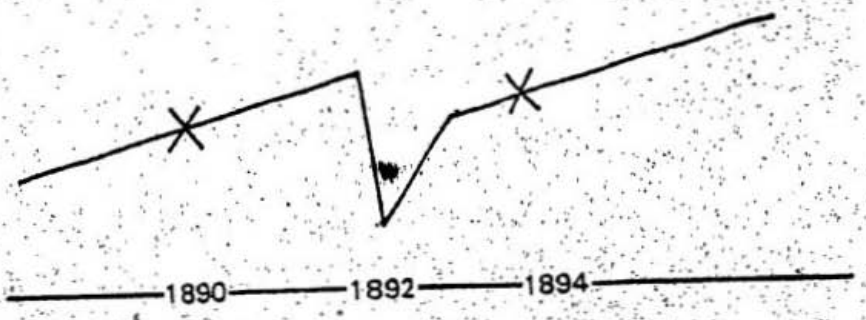
## POINTS AS ESTIMATES OF A LINE OF CHANGE



The drawn line represents the real, but unknowable line; an "x" a value for a known point. The estimate is the straight line (not drawn) between the two points.

Figure D:2

THE INDEX OF CHANGE AS AN ESTIMATE OF CHANGE IN THE NUMBERS OF STRUCTURES



change in either direction equally. In other words, it is desirable to have the line of change between, say, 80 and 100 given the same weight as the line of change between 100 and 80. The index has the same numerical value in each case, but is of different sign. The simple rate does not: negative change is expressed by a number which, in fact, cannot fall below -1 while positive change is expressed by a number without any upper bound.

Furthermore, the use of the index permits the retention of data in those cases where the pre-Fire count of a particular occurrence had a value of zero. Using the simple rate turns a logically possible event into a mathematical impossibility. Simply dropping such cases out of the analysis is rather costly in a thesis with so few cases. The index solves this problem (except in the uninteresting case where both pre-Fire and post-Fire counts were zero). It unfortunately does this only at the cost of not distinguishing between small and large changes where one value was zero. Neither, of course, does the simple rate of change.

(Note: this last point does not apply when the variable considered is something like street length. If a street did not exist in one period, but did in another, one cannot speak of its line of change. Fortunately, such cases are usually captured in other variables.)

A final, rather minor, practical consideration is that the index tends to even out errors in the original measurement of the pre-and post-Fire variables. Assessing the strength of this tendency is impossible without knowing the extent of the original error. This will not be elaborated upon, except to note that the index gives equal weight (in the sense that it uses each value twice) to each datum, while the simple rate gives more emphasis to the pre-Fire one.