CITIES OF KINDLING: GEOGRAPHICAL IMPLICATIONS OF THE URBAN FIRE HAZARD ON THE PACIFIC NORTHWEST COAST FRONTIER, 1851-1920

by

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In the Department of Geography

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Cities of Kindling: Geographical Implications Of The Urban Fire Hazard On The Pacific Northwest Coast Frontier, 1851-1920

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ABSTRACT

This thesis concerns the influence of fire on urban growth in the Pacific Northwest, specifically in the cities of Seattle, Tacoma, Bellingham and Port Townsend. Rapid urban expansion and reliance on wood frame construction were associated with fire losses greatly exceeding those of Europe. In the Northwest, spectacular conflagrations regularly destroyed parts of most cities. Existing studies fail to consider the impact of this destruction on urban morphology, particularly the evolution of building forms, street patterns and land use.

The thesis to be examined is that destruction by fire and cognizance of a continuing fire hazard led to significant changes in urban morphology. These included the transition from wood to brick and concrete/steel construction, widening and grading of streets, and development of building codes and zoning laws to segregate high fire risk areas. Fire is postulated to have played a major role in the urban transition from "cities of kindling" to modern fire-resistant urban cores of steel and masonry that had effectively occurred before 1920.

The thesis is primarily based on analysis of detailed fire insurance surveys carried out by the National Board of Fire Underwriters and the Washington Insurance Surveyor's Office, as well as Sanborn fire insurance plans and related publications. These are used to construct a longitudinal analysis of geographical change, resulting in detailed examinations of the effect of fire on urban growth, and establishing connections with industrial and commercial development, transportation and firefighting technology.
Part One of the thesis introduces the concept of fire in urban historical geography and the evolution of distinctly North American forms of building and firefighting. Preparations for and experience with fire in the study cities before 1900 is the subject of the second part, while the third illustrates the role of external forces, especially fire insurance companies, in physically reshaping these cities.

The thesis concludes that fire's major influence was in the insurance-inspired transition to concrete and steel after 1910, the earliest zoning laws and improvements in urban access for firefighting.
To My Mother and Father
ACKNOWLEDGEMENTS

Many people have contributed to the completion of this thesis. Although its content is an outgrowth of my own research interests and experience, I am indebted to Edward M.W. Gibson for providing the initial idea and, as my thesis supervisor, encouraging me to carry it through despite frequent periods of dark despair on my part. I am also grateful to thesis committee members, L. J. Evenden and P. L. Wagner for their comments and suggestions.

Other individuals whose contributions I must acknowledge are James W. Scott and Eugene Hoerauf of the Department of Geography and Regional Planning at Western Washington University; R. C. Harris of the Department of Geography, University of British Columbia; Barbara Guptill of the Government Research Assistance Library, City of Seattle; Hank O'Claire and Larry Leonard of the Washington Survey and Rating Bureau; Donna Handville of the American Insurance Association Research Library, New York; Nancy Campbell of the Unigard Insurance Group, Bellevue; Bill Bennett of the Bellingham Fire Department; and fellow geographer Tom Brace, Washington State Fire Marshall.

Other research institutions to whom I am indebted are the Seattle Public Library, the Whatcom Museum of History, the Jefferson County Museum, the Centre for Pacific Northwest Studies at Western Washington University, the Seattle Museum of History and Industry, and the University of Washington Libraries, especially the Northwest Collection, Natural Science Collection and the Architecture Division.
For financial support while attending Simon Fraser University, I would like to thank my employer, the Department of Geography, for its generosity with teaching assistantships and sessional instructor positions. The completion of the thesis would have been financially impossible without the forbearance of my two part-time employers, who have generously allowed me to dictate my own hours for the past three years. I am especially grateful to Supervisory Inspector Jay Brandt of the U.S. Customs Service at Blaine, Washington, and to Captain Tony White, Commander Robert Hathaway and Commander Royce Mattson of the U.S. Naval Air Reserve at Naval Air Station, Whidbey Island, Washington, for their understanding and cooperation.

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PART I

FIRE AND URBAN DEVELOPMENT
Thursday, June 6, 1889 was an uncommonly bright and cloudless day on the usually soggy shores of Puget Sound; indeed, the entire spring of that year had been uncharacteristically dry. In the rapidly growing young city of Seattle, the fir-planked streets and sidewalks were alive with activity as farmers, merchants, fishermen, sailors, loggers and housewives went about their daily tasks.

The soft tranquility of this spring day abruptly ended at 2:40 in the afternoon when an assistant cabinetmaker working in the basement of a paint and woodworking store on Front Street allowed a glue pot to boil over onto a gasoline stove. Within literally seconds, the wood frame building was on fire. Although the fire department was on the scene almost immediately, the fire had already spread to an adjacent saloon, where stored barrels of whiskey fueled the flames. By three o'clock, the entire block from Marion to Madison was engulfed, and flaming brands began to threaten other buildings. At this point, water pressure in the wooden fire mains began to fail and, because the tide was out, the steam fire engines could not pump water from the Elliott Bay side of Front Street.

Mayor Robert Moran took personal charge of the now-demoralized firemen (the Fire Chief was at a firefighters' convention in San Francisco!) and ordered the dynamiting of a number of wooden buildings to create a firebreak. These efforts proved futile, and by late afternoon the business district was doomed. The pillar of dark smoke could be seen in Tacoma, twenty miles distant, and efforts were turned to trying to save the
content of buildings in the fire's path. Bucket brigades were formed
to extinguish burning brands on individual buildings; some were successful,
but most were not, and by sunset the fire had defeated a last ditch effort
to contain it at Yesler Way. During the night, with nothing left to burn,
the conflagration extinguished itself in the tideflats south of Skid Road.

By morning, Seattle was a gutted ruin. Exhausted refugees slept among
piles of salvaged household goods, under tents, and in fern thickets near
the edge of the treeline. Mayor Moran declared martial law, called out the
militia, and swore in a Home Guard to prevent looting.¹

The spectre of such urban conflagrations was to continually haunt those
who would build, to use Carl Bridenbaugh's apt phrase, "cities in the wilderness."² For those seeking to understand the evolution and structure of the
North American city, the preceding account is notable for a number of rea-
sons: the carelessness that caused the fire, the susceptibility of the town
to the flames, the unbelievably rapid destruction, the loss of property and
threat to human life, and the precarious situation of the survivors are but
a few. Even more significant, however, is the fact that such conflagrations
were commonplace throughout the continent, especially in the years prior to
1900.

Statement of the Thesis

Rapid urban expansion and a reliance on wood frame construction were
associated with spectacular conflagrations which regularly destroyed all or
part of most Pacific Northwest cities. The thesis to be examined is sug-
gested by the preceding account of the Seattle fire of 1889 and a host of
similar descriptions: destruction by fire and the cognizance of a serious
and continuing urban fire hazard led to significant changes in urban morphology. These included the transition from wood frame to brick and stone construction, and later to steel and concrete; the widening, grading and surfacing of streets and alleys; and the creation of zoning laws to segregate areas of high fire risk. As a result, fire is postulated to have played a major role in the urban transition from "cities of kindling" to modern fire-resistant urban cores of steel and masonry that had effectively occurred before 1920.

It was the dangerous, yet commonplace, juxtaposition of fuel and flame in early Pacific Northwest towns that justifies their description as "cities of kindling"; native timber was the universal building material for houses, barns, stores, churches, sewers, piers, tools and furniture. Within or adjacent to these structures burned continuously the fires of early steam-age technology, from the kerosene lantern and home fireplace to the steam engines that powered sawmills, canneries, ships and locomotives, or the ubiquitous waste-burners that consumed sawdust and woodchips. On windless days smoke hung heavily above these towns and the distinctive smell of wood fire was inescapable, saturating not only the air but furniture, curtains and clothing as well.

By 1920, little of this volatile era remained. Business districts of brick and concrete were indistinguishable from those elsewhere in North America, and were linked to modern suburbs by paved streets and streetcar lines. Electricity was rapidly replacing open flame as a source of urban power, heat and light, and the internal combustion engine was on the verge of revolutionizing transportation. By isolating the morphological factors mentioned above, the thesis will consider the role that urban fire played in this remarkable transition.
Fire as an Urban Problem

Before delving into the specifics of fire in the cities of the study area, a general introduction to the historical relationship of fire and urbanization will help to clarify some essential points upon which the subsequent chapters are based.

The use of fire is unquestionably the greatest of all human discoveries. Not only has it figured prominently in religion and mythology, but it is also intimately related to the cultural and technological advance of civilization. The control of fire has allowed humankind an increasing level of mastery over the natural environment: early humans used fire to warm and illuminate caves or dwellings, to flush game for hunting, to cook an increasing variety of foods, and to clear fields for agriculture. Later the art of forging metals was learned, and ultimately the harnessing of steam to drive machinery led to what we now call the Industrial Revolution.

However, since the prehistoric past when humans first learned to use fire, there has also been a darker, negative aspect of the human-fire relationship: fire as an agent of destruction. This constructive/destructive dichotomy has persisted from the Stone Age to the Nuclear Age: fire out of human control—whether due to simple carelessness, lightning, or invading armies—has relentlessly destroyed crops, homes, cities and lives in every inhabited part of the world.

It is the relationship between fire and cities that requires elaboration here, for within this association lies yet another dichotomy. It is the control of fire—or more properly, the technology based upon this control—that makes the existence of cities possible. But at the same time, there continually exists the chance that at some point in history,
uncontrolled fire will destroy some or all of the city. The history of
the world's great urban centres, both ancient and modern, is replete with
examples of conflagrations that have destroyed enough of the city to per-
manently alter its morphology and/or character. Carthage and Cairo,
London and Rome, Moscow and Copenhagen or, more recently, Chicago and
San Francisco—all are examples of this cycle of destruction and rebirth.
In some cases, myths arising from the fire have become a permanent part
of the city's folk history, as with Nero's fiddle, Pudding Lane, or Mrs.
O'Leary's cow.

When the problem of urban conflagrations through time is considered,
a given city's potential for destruction by fire can be postulated to rest
on a combination of factors which are basically either environmental or
cultural. Both of these categories subsume a host of subfactors; the follow-
ing discussion will consider only the more salient.

Of the environmental fire potential factors, climate is the most
obvious, and its component parts play a major role in the urban-fire rela-
tionship. Seasonal variations in temperature are of paramount importance
because they determine the extent to which fire must be used indoors for
heating. Because of this, urban fires have historically been a more serious
problem in colder climates. In the case of precipitation, wetter climates
would seem to be less prone to conflagration than drier ones, although this
research suggests that the relationship is much more complex and appears
to hinge on human perception of precipitation rather than actual statistics.

Drought cycles appear to have a direct correlation with urban fire
potential (as the case of the 1889 Seattle fire suggests), although there
is a tendency to think of these only in terms of their effect on non-urban
regions. Another climatic factor is wind, which is invariably present at
major conflagrations and is most often the element which determines the
length of time necessary to control the fire.

The topography of an urban site is also a significant environmental
factor. Not only do features such as ridges, hills, rivers and lakes serve
as controls on the spread of fire, but they also tend to define land-use
zones having differing combustion potential. For instance, a waterfront
industrial area would present a greater fire hazard than a surrounding
commercial or residential area. Vegetation tends to be an insignificant
aspect in the urban core except during the earliest phases of urbanization,
but it can present serious problems in certain residential areas, as the
perennial bushfires of Southern California or Australia graphically illus-
trate. Forest fires which encroach upon urban areas are mercifully rare
but not unheard of, especially in heavily forested regions of the world.
In North America, the disasters at Peshtigo, Wisconsin (1871) and
Tillamook, Oregon (1907) are examples, while similar holocausts have
occurred in Scandinavia and the Soviet Union.

The question of the availability of building materials is a transi-
tional one, linking both environmental and cultural elements. Generally
speaking, European settlers in North America were virtually limited to
whatever building materials were immediately at hand until they had pro-
gressed beyond a simple frontier subsistence economy. On the Eastern Sea-
board and in the St. Lawrence Valley, the preeminent building material was
wood. It was not until the "second generation" of architecture that other
available materials were used, such as stone in New England and Quebec,
or brick in the southern colonies, and even so there remained a strong
tendency toward wood frame construction in all but major public and com-
mmercial buildings until well into the twentieth century.
The last environmental aspect to be considered is the access of an urban site to either ground or surface water. Initial research has suggested that access to water for urban firefighting was second only to the need for potable water in North American cities. For either purpose, adequate storage facilities for water were considered critical, especially in the drier climates. It would appear that in regions of copious precipitation, or in coastal or riverine locations, the need for water storage and access was taken much more lightly.

The second major group of fire susceptibility factors is those which are essentially man-made: the cultural and economic foundations of a given urban place. Of these, the most critical is the urban economic structure, which comprises both internal and external components. Internal components are most usefully understood within a framework of urban evolution for, historically, fire has been a more serious threat in the earlier stages of a frontier city's growth due to an acceptance of risks that in retrospect seems foolhardy. The classic example is the western "boomtown," where hastily-erected wooden structures were thrown up helter-skelter as temporary places to live or conduct business until one's fortune could be made and the town could be rebuilt in a more permanent fashion. The external component of urban economic structure refers to the city's situation with regard to other settlements and the existing transportation network. Frontier cities were invariably isolated, so that any type of disaster--fire, flood, disease, Indian attack--had to be faced using whatever limited local resources were available.

In a similar vein, the internal social organization of a city was related to the relative fire hazard. In many Western cities a volunteer fire department was the first municipal organization to be formed, preceding
even the police department. In resource-extractive "company towns" the fire department was an integral part of the industrial organization, as in the case of coastal sawmill settlements. In either situation, the fire department soon became a political and social springboard, creating patterns of influence which have persisted through the years. Also to be considered here is the point that most of the volunteer firefighters were merchants, that segment of society with the most obvious vested interest in the protection and preservation of the urban core. In this sense, the early fire department was the forerunner of the male businessman's service club; later they would become the colourful harbingers of professional inter-urban athletics as well.

The level of prior firefighting experience tended to vary greatly as European settlers spread out across North America. On the East Coast, the response to the urban fire hazard reflected closely the respective culture of the various national groups: New York's earliest fire control and prevention measures were based on those of the Netherlands, those of Boston and Charleston on England, Quebec City and Montreal on France, and St. Augustine on those of Spain. Each national culture contained its own usually distinct method of response, and each was subsequently modified by both the realities of the North American environment and the cultural diffusion and mingling of the colonial and post-colonial eras.

Favoured building methods and styles brought from Europe were similarly modified by the frequently different conditions encountered in the New World. The adoption of wood as the quintessential North American building medium exemplifies these modifications. The inherent danger of wooden construction in colonial urban cores was demonstrated repeatedly as these areas would burn and rebuild in a frequently repeated cycle.
It was not until these cities achieved a level of economic maturity which permitted safer but vastly more expensive building materials and methods that the problem was reduced to any noticeable extent, and even then certain categories of buildings—the residential areas in particular—continued to be built from the least expensive and therefore most combustible materials.

**Research Objectives and Methodology**

With the preceding in mind, let us now turn to the specific objective of the thesis: an examination of the effect of urban fire on the morphological growth and structure of the study area. The concept of morphology is a fundamental one in urban geography, and describes both the form and the internal structure of cities. Form here refers to the disposition and arrangement of the various urban elements, including buildings, streets, open spaces and their relationship to topographic features; structure may be thought of as the internal composition of these elements, especially the materials and construction techniques used in various building types.

The three morphological subareas to be tested are derived from those described by Harold Carter:

1. **Urban plan**: the actual layout of the urban area, including street patterns and widths, and the disposition of open areas;

2. **Land use**: the urban function of a given land unit, usually characterized as industrial, commercial, residential or recreational, or subdivisions thereof; and

3. **Building styles and materials**: the wide range of building types, architectural styles and construction materials and techniques employed across the time span of urban founding and growth, in this case ranging from log cabins to modern office blocks.
Within this framework, the thesis seeks to examine the concept of morphological growth--or, as James Vance has termed it, "morphogenesis"--as it was affected by both the occurrence of, and the threat from, urban fire. The latter point is notable because, as Vance has pointed out, morphogenesis includes both planned and unplanned growth. In this study, the distinction will appear in changes in urban form caused by fire, as well as conscious adjustments to prevent fire.

During the course of examining the thesis, a number of secondary objectives will also be considered. One of these will be to relate the effect of fire to other factors affecting morphogenesis, especially such topics as urban transportation systems and changing levels of external investment. The thesis will also consider the relative importance of measures designed to prevent fire, such as building codes as well as those directed at fire suppression, including firefighting technology and water systems.

Studies of urban development run the risk of being superficial if they do not consider the role of evolution in urban form and function. The importance of growth phases--or cycles of "booms and busts," in the vernacular of regional historians--cannot be overemphasized in this study, for the mixture of early "impermanent" morphological features with later permanent ones was to prove of paramount significance in describing the relative fire hazard at various points in urban history. Thus, this thesis draws on the methodological approaches associated with historical geography, most notably the work of Andrew Clark and Donald Meinig. The result is a longitudinal analysis of geographical change over time, relating the role of urban fire in the urban morphogenesis of the study area.
The Study Area

The geographical areas chosen to test this thesis are the Washington cities of Seattle, Tacoma, Bellingham and Port Townsend (Map 1). These cities occupy a distinct natural environment, the Puget Sound-Strait of Georgia Lowlands. Here the primary climatic features of moderate temperatures and abundant rainfall resulted in a distinctive vegetation pattern of dense coniferous forests extending from timberline to the water's edge. The proximity of good timber and navigable waters influenced the siting of each of these four cities, and insured that their earliest buildings would be constructed of these highly flammable softwoods, especially fir and red cedar.

These four cities shared economic similarities as well: all began as sawmill towns and, despite later diversification into other extractive industries, remained centres of forest product shipping and manufacturing well into this century. All competed vigourously to become the termini of transcontinental railroads, and their growth rates after 1890 were largely dictated by their access (or lack thereof) to the national rail net.

There was a common cultural component in the four study cities as well: as elsewhere in the region, most of the founding families were of New England extraction, particularly those with connections to the lumber industry. Not until the railroad booms of the 1880's would the ethnic pot be stirred by the addition of large numbers of Scandinavians, Chinese, Germans and Canadians. Thus, for much of the early part of this study, the urban form of these towns suggests a whitewashed, clapboard-framed New England village awkwardly plopped down into a muddy clearing in the primeval forest.
MAP 1: THESIS STUDY AREA
A final advantage of using Seattle, Tacoma, Bellingham and Port Townsend is their relative youth. During the seven decades of the study period, all made the difficult transition from wilderness clearing to modern urban/industrial centre. The compression of this evolution into literally one lifetime meant that records of the experience—diaries, business accounts, literature, maps and, especially, photographs—are available today that give a much more detailed image of urban morphogenesis than elsewhere in North America.

Within these temporal boundaries there is another historical demarcation line: the arrival of the first transcontinental railroads. By 1900, the integration of the cities of the Pacific Northwest into the national economic system was complete, thus ending what Meinig has termed the "nuclear/early regional" stage of urban growth, and beginning the "national/metropolitan" phase. The significance of this transition or morphogenesis is reflected in the thesis by considering the events of the former period in Part II, and those of the latter in Part III.

Survey of Literature

Formal literature on the relationship of fire and urban growth and morphology is decidedly spare. Reasons for this paucity of analysis and interpretation are manifold, but for purposes of this discussion, the major one is that while the subject is inherently geographical in nature, North American historical geographers have tended to leave urban matters to others and concentrate on regional topics.
This is not to say that there is no formal literature on the subject of fire and urban geography, but rather that what exists is widely scattered in work done in various subareas of history, economics, cultural geography, architectural history and a host of esoteric peripheral fields which include firefighting, engineering, insurance history and municipal government. The assembly, organization and interpretation of these and other heretofore unrelated data sets within the framework of historical geography constitutes the procedural core of this study. The following discussion considers background literature and suggests the direction the research will take.

The role of fire in the evolution of cities would seem to be an obvious field of inquiry for the geographer, related as it is to the central ideas of environment and culture. However, most of the geographical literature dealing with fire does so only in an anthropological context, as with the work of Carl Sauer and H. H. Bartlett. The relationship between fire and architecture, and some of the hazards therein, was noted in 1926 by anthropologist Walter Hough, but studies considering the geography of house form and culture—those of Amos Rapoport or Fred Kniffen in particular—mention it only in a peripheral fashion.

Within the relatively voluminous recent literature on urban geography produced in the last two decades, the question of the urban fire hazard has been neglected by both European and North American authors. However, both O. H. K. Spate and James Vance allude to the great influence of the Great London Fire of 1666 on urban development in Britain and North American colonies. Even the recent Geography of American Cities by Risa Palm neglects to mention the urban fire problem, an omission made all the more curious by her interest in the distinctiveness of American cities,
their close relationship with their physical environments and the sub-field of natural hazard research.\textsuperscript{14}

The subject of fire and North American cities has been served much better by urban historians than by geographers. The seminal volumes of Carl Bridenbaugh, \textit{Cities in the Wilderness} (1938) and \textit{Cities in Revolt} (1955), describe the growth of the major colonial cities and the importance of urban society during the colonial period,\textsuperscript{15} while Richard Wade has extended Bridenbaugh's approach to encompass the urban frontier of the Ohio and Mississippi valleys and Sam Bass Warner, Jr. has elaborated on the importance of the city in the transition from a rural to an urban/industrial North American society.\textsuperscript{16} All of these consider the significance of the threat of fire to the economic and social fabric of frontier cities, but the necessarily broad scope of their research, both geographically and temporally, limits their exploration of the topic.

The urban history of the Pacific Northwest comprises individual city histories. Some, like Morgan's \textit{Skid Road} and \textit{Puget's Sound}, Sale's \textit{Seattle: Past to Present} and Simpson and Hermanson's \textit{Port Townsend: Years that Are Gone}, are very useful but make little attempt to put local history into a continental perspective.\textsuperscript{17} There is an obvious need for an interpretive history of urban development in the Far West but, at this writing, only John Reps' \textit{Cities of the American West} has attempted to deal with the subject.\textsuperscript{18} Reps' exhaustive efforts are complemented by Lawrence Larsen's \textit{The Urban West at the End of the Frontier}, but the latter is too brief and too narrowly focused to consider the question of the fire hazard.\textsuperscript{19}

The architectural history of Northwest Coast cities exhibits many of the same shortcomings as regional urban history. For the most part, all
that exists are a number of detailed "catalogues" of significant buildings for individual cities. These seldom attempt to integrate buildings with their urban districts or the city's history. Local architectural history seldom ventures into non-visible details of building engineering and construction, and virtually never mentions building codes, fire laws or insurance considerations. Carl Condit's *American Building* provides an excellent overview of structural considerations and building materials on a national scale, however, as does the two-volume work by James Marston Fitch, also titled *American Building.*

Literature on firefighting in North American cities owes a great deal to the avid interest of a small group of enthusiasts whose interests lay in examining in meticulous detail the equipment, costumes and organization of large urban fire departments, primarily in the Eastern United States. In many ways they resemble railroad or cowboy buffs with the singular exception that, unlike the latter two groups, their ranks have not yet produced a first-rate historical analysis of the contribution of firefighters to the evolution and history of the North American city. Major works of popular history on the subject include those of John Morris and Donald Cannon, both of which emphasize the colonial period. Much more valuable are Ditzel's *Fire Engines, Firefighters*, a history of the evolution of firefighting equipment and techniques, and Earnest's work on the American Volunteer fire department. Only one work on regional firefighting history has appeared for the study area: Talbot and Decker's *100 Years of Firefighting in the City of Destiny: Tacoma Washington.* Also useful is Ralph Andrews' *Historic Fires of the West*, which is very general, but does consider the fire hazard in a regional context.
Morphological studies of North American cities are exceedingly rare; most of the work in this field has been done in Europe, such as that of M.R.G. Conzen on northeastern England.\textsuperscript{24} One shining exception to this is Kenneth A. Erickson's 1965 Ph.D. dissertation entitled "The Morphology of Lumber Settlements in Western Oregon and Washington," although the broad geographical focus and concentration on smaller mill towns make it largely tangential to the thesis at hand.\textsuperscript{25} Perhaps the most complete body of research on the morphology of towns of the American West is that of John W. Reps, especially Cities of the American West (1979) and The Forgotten Frontier (1981), but these are comparative studies, and too general to provide morphogenetic detail. The best example of a morphological study utilizing a single theme is John R. Stilgoe, Metropolitan Corridor: Railroads and the American Scene, in which the railroad is used to explain the appearance of North American cities.\textsuperscript{26}

While there is a decided lack of formal literature on both urban morphology and the fire hazard in North American cities, there is nonetheless a substantial body of such information in various government, corporate and archival files. The threat of fire and the means necessary to combat it generated a number of insurance survey reports and maps, building plans, fire department reports and similar material, most of which was never published. Best of all, such materials contain mostly hard, critical data, as befits the seriousness of the topic. Other sources of information for morphological data prior to 1920, such as chamber of commerce pamphlets, or magazine and newspaper articles, paint a very rosy picture of a city's appearance and the grace and beauty of its buildings. But the contrast between this and a fire insurance surveyor's report for the same city at the same time can be startling for those seeking "morphological truth."
CHAPTER 1
NOTES


4. Ibid., 8.

5. James E. Vance, Jr., This Scene of Man: The Role and Structure of the City in the Geography of Western Civilization (New York: Harper's College Press, 1977), 4-5.


9. Ibid., 160.


CHAPTER 2

THE EVOLUTION OF NORTH AMERICAN BUILDING TECHNOLOGY

The complex relationship between architectural history, urban planning (or lack thereof) and fire technology on the North Pacific Coast frontier can best be approached by examining each of these discrete elements in historical perspective. As has been previously suggested, the origins of the terrible North American urban fire losses of the nineteenth century are to be found in the wrenching transfer of European culture and technology to a totally new environment. In this chapter, then, we will examine first the effect of this geographical relocation with respect to building technology, then carry the development of the resultant North American techniques of building construction up to the mid-nineteenth century when they were introduced to the Pacific Northwest by the first British and American settlers. In other words, this discussion could properly be considered an examination of the "fuel" that would feed the great urban conflagrations of early American and, especially, Pacific Northwest history.

European Building in the New World

Architecture in its broadest sense is essentially the shaping and controlling of the natural environment for both utilitarian and symbolic ends. It was the Roman architect Vitruvius who postulated that the ideal building represented a synthesis of optimum function, sound construction and sensory stimulation.\(^1\) But the way in which these elements are combined and the
importance assigned to each are controlled by other factors: the cultural
and technological characteristics of the builder, available economic resources
and, perhaps most important, by climatic considerations.

Culture, technology and environment, then, are the universal factors
which shaped early North American building, not only of the first Europeans
but that of the indigenous Indian population as well. However, Indian
architecture was to have little impact on the early Europeans: native
societies were "... possessed of virtues so remote ... as to be indis-
cernable ... and Indian building along the Atlantic seaboard in no way
provided the immigrants with the emotional and symbolic security needed
in what was to them an alien land." Only in the most desperate of cir-
cumstances did the colonists utilize Indian building forms--dugouts,
wigwams or teepees--and then only for the shortest possible time, usually
their first North American winter. This process was repeated two centuries
later when the first white settlers encountered the cedar longhouses of the
North Pacific Coast tribes.

This first phase of colonial building might well be termed the
"architecture of survival," for there was little in their European experi-
ence to prepare the settlers for the bitter Quebec or New England winter,
or the heat of a Virginia summer. James M. Fitch has observed: "An en-
vironment so overwhelmingly hostile to both individual and social life left
no alternative but the creation--as rapidly as might be--of a base of opera-
tions in which the colonists could lay their plans, husband their strength,
and sharpen their tools for the conquest of a continent." All of the colonists on the Atlantic seaboard, regardless of nation-
al, had come to North America with a knowledge of one or more of the
then-standard European structural systems: wood framing, and brick or
or stone masonry. What preceded the type of architecture today associated with the colonial period of North American history was almost two centuries of experimentation with medieval building forms and theories as the typical settler would normally join inherited structural concepts with local materials to produce what would then gradually become a distinctive continental architecture.

Another point which bears directly on the transfer of architectural technology to a frontier region is that there was a tendency for a society's entire technological evolution to be "replayed." Alan Gowans has pointed out that, in the initial man/land confrontation, the colonists were forced back to a "Stone Age" relationship with nature, with few tools and a minimal capacity to control the environment by creating shelter. Following this was an "Iron Age" in which men with basic tools--axes, hammers, saws--shaped trees into timber, clay into bricks and chopped stone for foundations and fireplaces. When this in turn was succeeded by an "Industrial Age," the buildings of the Iron Age melted almost imperceptibly into folk architecture. Further, this sequence of relative environmental control was played out in every corner of North America:

A century after the last bark-and-log and wattle-and-daub shelter on the coast has rotted into ruin, their like appears on the foothills of the Appalachians...; a century after that, in the log cabins of the old Northwest Territory, then in sod houses of the Great Plains.  

North American Technological Adaptations

The architecture brought to the New World by European colonists was essentially a recreation of the medieval building of seventeenth century Europe. Alan Gowans has in fact suggested that the entire seventeenth
century could be thought of as "Medieval America." But within the previously outlined framework of cultural building techniques, there began almost immediately a process of modification to meet the frequently different conditions of the North American physical and cultural environment.

The peculiar characteristics of the radically different New World human environment was at least coequal with the physical environment in changing European building techniques. As with earlier cultures, early North American building was folk architecture: the owner designed and built a structure utilizing certain technological precepts and locally available material. Vernacular buildings lacked theoretical or esthetic pretensions and, as a rule, closely fit both their building site and its micro-climate.

With increasing colonial urbanization and a concomitant trend toward a more specialized labour force, vernacular buildings were gradually replaced with those erected by tradesmen: carpenters, joiners, cabinetmakers and thatchers. Their work was coordinated by one whose speciality was bringing together these elements to produce a finished structure—the fore-runner of the modern building contractor. While the overtaking of virtually all urban building construction by skilled labour was a prominent feature of nineteenth century industrialization, this is not to say that vernacular building disappeared altogether. In rural areas and, most apparently on every new frontier, the vernacular folk building reappeared. The result was that North American domestic architecture displays two dominant strains: those buildings created by craftsmen in formal, period styles of architecture, and a persistent substratum of folk building "...brought over in the minds and skilled hands of the earliest settlers and perpetuated by their descendents."
Despite the fact that each successive wave of immigrants contained its share of skilled artisans, the relationship of this labour force to society was to evolve in a totally different fashion from Europe, with immediate and obvious effects on the built environment. On each new North American frontier, from Virginia and Quebec to California and Alaska, labour was in such short supply that it not only required decades for true specialists to evolve, but arriving specialists were forced to become jacks-of-all-trades: "Lawyers had to prepare account books as well as briefs; . . . ministers had to farm; . . . and the blacksmith had to turn out hinges and ornamental ironwork as well as nails and gun barrels."\textsuperscript{8}

The most obvious result of this labour shortage was the breakdown of the apprenticeship system. It was virtually impossible to retain young men in a six- or seven-year training program mastering skills that might never be needed when they could simply move to the next colony and establish their own business. Newspaper advertisements for runaway apprentices were a feature that continued well past the American Revolution. As Frederick Jackson Turner so perceptively suggested in 1893, as long as there remained a frontier to attract and absorb surplus population, there would continue to be a shortage of labour which would come to characterize North American development.\textsuperscript{9}

The passing of the frontier at the end of the nineteenth century, whatever its effect on the labour shortage, came too late to alter several tendencies which by 1900 had come to represent almost all of North American civilization. The first was a penchant for labour-saving devices. For instance, both the British and the Dutch were accustomed to pit-sawing—long straight saws operated by two men, one above and one below, in an earthen excavation. When this process proved too time-consuming, it was mechanized:
only thirteen years after the Pilgrims landed, a power sawmill was in operation at the Falls of Piscataqua on the Maine/New Hampshire border. Although it was . . . "a cumbersome apparatus--a huge swishing up-and-down adaptation of the pit saw . . . ." it was successful and, most significantly, pre-dated the earliest sawmill in England.\(^{10}\)

A second North American characteristic was that of general simplification: New World buildings, furniture and other utilitarian arts were invariably plainer and more straightforward than their European counterparts. Finally, and most important, was the appearance and encouragement of standardization: "From very early times training and circumstances had led American craftsmen to reduce the variants and differences among their inherited European models to a few common denominators," a reversal of what would seem to be the normal pattern of evolution (i.e., increased specialization).\(^{11}\) It is here that we can see the first foreshadowing of such later milestones as Eli Whitney's standardized rifle components and Henry Ford's assembly line.

The recurring shortage of labour in North America, when considered in light of the great abundance of natural resources, meant that another overriding feature of development here was what appeared to Europeans excessive wastefulness. For instance, American fireplaces were designed to accommodate large logs--a practice wasteful of fuel but which economized upon labour-intensive wood-chopping. Similarly, early woodworking machinery tended to create more waste, use more power and require less maintenance than European counterparts; more than one European thought the American lumber industry to be criminally wasteful, but this represented only the substitution of cheap wood for expensive labour. Economic historian Nathan Rosenberg has suggested that throughout the entire process of
industrialization, North American industrial practices substituted natural resources for other, more scarce factors of production. Other historians have attempted to explain the distinctive national character of North Americans as having been shaped by this economic abundance: Frederick Jackson Turner was the earliest, but David M. Potter's perceptively titled *People of Plenty* is the most balanced and recent revision of this theory.  

**Environmental Factors**

To the historical geographer studying the built environment, perhaps the most logical frame of reference for architectural analysis is an essentially holistic concept of man/environment relationship. Unfortunately, the deeper one burrows into the literature on architectural history, the less apparent this relationship becomes. In 1972, James Marston Fitch lamented: "... American architecture today pays less attention to ecological, microclimatic and psychosomatic considerations than it did a quarter-century ago. Despite its visual novelty and purported modernity, our architecture is on the whole as formalistic as its main configuration—and hence as unsatisfactory in its overall performance—as it was half a century ago ..." Indeed, the overwhelming presence of a technological level that completely manipulated the natural environment—heating, cooling, ventilating, artificial illumination, acoustics, electronic communication and rapid transportation—led several generations of architects to virtually ignore the circumambient environment as a design factor (although it should also be noted that in the interim, the "Energy Crisis" of the mid-1970's has begun to drastically alter this perception).
The result of this total reliance on technology by architects has carried over into architectural history, for there has been a disturbing tendency within the field to attempt to divorce the esthetic process from the rest of human experience. In other words, it is as if architecture's esthetic impact upon us was an exclusively visual phenomenon. But the geographer knows—if the architect or the historian does not—that architecture, like man himself, is "... totally submerged in the natural external environment," and that: "In architecture there are no spectators: there are only protagonists and participants. The body of critical literature which pretends otherwise is based upon photographs of buildings and not the experience of the actual buildings at all." It is only with this in mind that we can begin to understand the nature of that relationship between fire and early building in the Pacific Northwest study area for, as we shall see, it is the two central environmental factors—climatic and available building materials—that largely determine susceptibility to fire during the preindustrial and early industrial phases of urban development.

The significance of the North American thermal environment is still not adequately appreciated by most historians of architecture. Not only had the various cultural groups evolved proven structural systems of wood and masonry over the course of centuries, but they had done so in a climatic setting that exhibited relatively little variation, whether from year to year, or century to century. Fitch, speaking of the Massachusetts Bay colony, observed: "It is still not generally recognized that if the Pilgrims had landed on a nearby planet instead of the New England coast, they could hardly have made a more abrupt switch in thermal environments." In Massachusetts they found a far more severe climate whose annual cycle had a July–December temperature spread more than twice as great as that
in the south of England. They also encountered harsh snowstorms, oppressively long freezes and vicious windstorms, the likes of which they had never experienced. Similar adjustments were made by other groups: Quebec, the Maritimes, the Southern Tidewater—all necessitated change in building technology for radically different patterns of temperature, precipitation and exposure, and requirements for heat and ventilation.

The destructive effect of building frame movement in extreme climates was related not only to inadequacies in medieval framing techniques, but also to the building materials utilized. The oak, stone and brick that were commonplace in Europe were either unavailable or too expensive for most North American builders, with the result that local wood became the standard building material. This was true not only for buildings, but for bridges, canal locks, furniture, clipper ships and fuel as well—preindustrial North America was a society whose very existence depended on technology based on wood and woodworking. Americans were forced to depend on wood for daily life in ways forgotten by all but a few European societies, and woodworking ultimately became a fine art. The urban islands of Old World elegance based on brick, stone and metal—Quebec, Boston, Philadelphia—which had been planted by the mother countries, tended to be replaced by the more democratic building medium of wood as settlement moved further inland. By the time of the American Revolution this transition was complete, and the coming century of mechanization and industrialization brought wood into a new and closer relationship with the national economy. It was not until after 1900 that the consumption of North America's forest resources by steamships, railroads, ironworks and building trades finally created a demand which was to prove more inexhaustible than the forests of the country. 17
The inherent flexibility of wood as a building medium and its tendency to shrink, expand and warp in response to temperature and humidity caused some initial problems among Europeans who were unfamiliar with the practice of seasoning building lumber, however. John Rempel has noted that, particularly in the Maritimes and Upper Canada, there are innumerable examples still in existence of log buildings which are completely out of plumb due to a British builder utilizing a Scandinavian-inspired frontier building form without considering the possible climatic effects.  

Another area where the North American thermal environment was to drastically affect building was that of heating technology. The open fire, the hearth flame, was a universal element of European building tradition from prehistoric times to the nineteenth century. Whether in a rustic cottage or the lord's castle, the open fireplace provided heat, illumination and cooking facilities all in one central unit. Building materials for the fireplace chimney ranged from forms of "wattle-and-daub" at the lower end of the socio-economic scale to brick and dressed stone at the other; the former was frequently the first casualty of the American winter, for it proved unable to produce the amount of heat necessary without destroying itself and the surrounding house (although it could be noted that wattle-and-daub fireplaces did persist in the southern colonies for many decades into the nineteenth century).

The need for adequate heating in the buildings of the northern colonies is best characterized by the size and location of the large fireplace and chimney: "The fireplaces themselves were none too efficient, but the mass of the chimney--located in the center of the house and occupying a disproportionate amount of floor space--absorbed the heat of the flue gases and radiated it into the house." Despite this clever adaption, however, the
colonial fireplace was a poor heat source and, "... romantic legend notwithstanding ... cooking on them was backbreaking drudgery."19

The technological breakthrough which was to succeed the open hearth was the cast-iron heating stove and, like the structural modification necessary to make houses weathertight, its invention was spurred by environmental considerations. The ancestor of all modern stoves, furnaces and air conditioners was the cast-iron stove introduced by Benjamin Franklin in 1744. Although Franklin is often credited with having invented the cast-iron stove, it is probable that he developed the idea of standardized, mass-production units while in France during the Revolution, for there is ample evidence that French habitants in Quebec were using cast-iron stoves to heat their homes by 1700. By the time the Franklin stove was introduced in Philadelphia, stoves "... from the St. Maurice ironworks at Trois-Rivieres were in use all over Canada."20

Questions of origin aside, the Franklin stove and its Quebec predecessors revolutionized heating and cooking in North America. By utilizing the most modern available material of the time, foundries were able to mass-produce units from a minimum number of standardized parts that were lightweight, self-contained, efficient and relatively inexpensive. In all of these respects, they differed drastically from the ponderous masonry and tile units becoming common in Europe.

The original Franklins were half-fireplace and half-stove, but their most significant feature was their independence from the existing chimney: they could be installed virtually anywhere that could be reached by a length of stovepipe. By the middle of the nineteenth century, the United States and Canada led the world in iron stove production and, with the steam boiler, were as characteristic of the age as hydraulic power,
electricity and automobiles are of our own. European visitors often com-
mented negatively about the manner in which these appliances dominated the
North American home and workplace: Charles Dickens in the 1840's called
them "red-hot monsters," and Oscar Wilde four decades later was horrified
by their usual location in the centre of the room.21

The theory behind the sources of the cast-iron stove was that of the
concentration of the heat source within a reduced, fire-resistant space.
In order to achieve true thermal efficiency, "... all the skills of a
scientific century were needed to channel the heat effectively ... ."
The efficient utilization of heat by correctly directing the combustion
gases soon became a problem for the scientist rather than the craftsmen
and, by the nineteenth century, the art of heating buildings, like that of
constructing them, was gradually becoming the domain of specialists using
industrial techniques rather than folk craftsmanship; this is the pro-
cess Siegfried Giedion has called "the mechanization of the hearth."22

The Nineteenth Century

The early years of the American Republic were dominated by an agricul-
tural economy, although the beginnings of industrialization were apparent
by 1800. This was especially true in New England, as the early textile,
tool and machinery industries began to appear, fed by capital from the emerg-
ing financial centers of Boston, New York and Philadelphia. As the pace of
industrialization quickened in the early part of the century, the major
determinants in shaping building techniques "... soon came to be industry,
finance and the railroad, with the last destined to become the most potent
factor."23 The rise of cities led to larger and more diversified building
types, especially commercial and industrial buildings, and monumental state and federal government edifices as well, the latter owing to the parallel expansion of the role of government with that of business in urban construction.

Nineteenth-century North American builders had available to them three major structural systems: timber framing, masonry, and iron and steel framing. As has been previously noted, the use of wood in virtually every type of building—residential, commercial or industrial—was commonplace until midcentury. By the end of the U.S. Civil War, masonry and iron-frame construction had largely replaced wood in the cities of the east, but wood frame construction for the urban core persisted in the frontier regions of the Far West; in residential construction, it has remained the standard building material to the present.

The following section is a discussion of these three structural systems across the range of building types common to the North American city during this period. Such an elaboration of a seemingly peripheral subject is necessary because, as will be demonstrated in subsequent chapters, the early settlers of the North Pacific Coast were familiar with a relatively fire-resistant form of building which had evolved in the East and Midwest, but were unable to apply it on the frontier for several decades. Thus, their situation was analogous to that of the first Europeans on the East Coast upon their discovery that tried and true medieval forms of building were unsuited to their new environment.
Timber Frame Building

Wood was the obvious choice for the overwhelming majority of all types of buildings and structures in the early period of American nationhood. In most regions, the presence of adjacent forested areas kept transportation costs low, and wood could be easily shaped by simple hand and tool techniques. Furthermore, wood's physical properties enhanced its popularity: it is strong in both tension and compression, resists bending, and is usually very durable if simple precautions are taken to avoid rot. Skill in basic carpentry was almost universal, and traditional handicraft skills were sufficient to build everything from houses and farms to mills and bridges.

The heavy New England frame of medieval lineage with its posts, beams and joists proved capable of being "... enlarged to provide the structural basis for a great diversity of buildings--mills, warehouses, railroad stations and roundhouses, stores, dwellings, and office blocks ... . Timber frames were usually limited to an area in plan of 50 x 150 feet and to a height of three stories ... ." As a result, the heavy timber frame was soon adopted for the earliest industrial buildings. The first textile mill in the United States, the Slater Mill at Pawtucket, Rhode Island, was erected in 1793 as simply an enlarged version of the New England frame house:

A stone foundation carries the timber sills into which the wall columns are framed; the intermediate columns rest on separate stone footings. Girders span longitudinally over the tops of the columns at each story, and the floor beams and roof rafters are framed into them. Joists extending between the floor beams carry the plank floor, and studs set between the wall columns support the sheathing and clapboard siding that constitute the curtain wall.
This three-story mill—the ancestor of every Pacific Northwest sawmill and cannery—still stands in its original location as testimony to the fundamental strength of its simple and rugged design. Indeed, the only major drawback to this system of column-and-girder construction was its vulnerability to fire. The most practical method of reducing this danger was to substitute stone or brick for the clapboard exterior walls, a step that occurred around 1810. Soon afterward, the masonry curtain wall became a bearing wall supporting a timber-frame interior, a technological advance that was utilized for large commercial and industrial buildings well into the present century.

Despite the success of the expanded New England frame for mills and, later, factories and commercial buildings, it was much too awkward for houses, barns and other smaller structures necessary in rural and frontier settlements. It was at this point—the mid-1830's—that the conjunction of industrial encroachment on skilled hand trades, the lack of skilled labour, the abundance of material resources and the arrival of the architectural frontier at the edge of the Great Plains combined to produce a technological revolution: the balloon-frame method of timber construction. Within a decade, this invention "...converted building in wood from a complicated craft, practiced by skilled labor, into an industry."²⁶

The principle of the balloon frame is simple: instead of building with heavy timbers joined by handcrafted mortised and tenoned joints, thin plates and studs of machine-cut lumber fastened by lap joints, held by machine-cut wire nails, were erected like boxes. The lightness of the timbers allowed even large buildings to be built by a handful of men in a short amount of time using only a few basic hand tools—hammer, saw, square, and nails—with perhaps only a planbook as a guide to the finished product.
Such a revolution seemed heretical to carpenters and joiners, whose entire guild was suddenly questioned, and they viciously attacked the new method at every opportunity. But by 1869, the author of one of the more popular builder's guidebooks could assert:

The Balloon Frame has passed through and survived the theory, ridicule, and abuse of all who have seen fit to attack it . . . . Its name was given in contempt by those old fogy mechanics who had been brought up to rob a stick of lumber of all its strength and durability by cutting it full of mortices, tenons and auger holes, and supporting it to be stronger than a far lighter stick differently applied, and with all its capabilities unimpaired . . . . The name of 'Basket Frame' would convey a better impression, but the name 'Balloon' has long ago outlived the derision which suggested it . . . . The principle of Balloon Framing is the true one for strength, as well as for economy . . . and . . . can be put up for forty percent less money than the mortice and tenon frame.  

The balloon frame was most probably invented in 1833 in Chicago by George W. Snow, who built St. Mary's Church utilizing the technique. The building cost $400 and was erected by three men in three months--half the money and half the time that would have been required using the conventional frame. The speed with which balloon frames could be built was astounding: in one week of April, 1834--six months after completion of the church--seven new Chicago buildings went up; by mid-June, there were seventy-five more; by October there were over 500, with four or five going up each day. The time from commissioning to completion of a frame house was down to one week by the end of the year.  

For the next forty years, balloon framing was referred to as "Chicago construction"; by 1880, the term had faded from use because there was virtually no other framing method in use in North America.

The balloon frame was seen by nineteenth century builders as the most important influence on domestic architecture and, in fact, without it the rapid rise of the cities of the West would have been impossible. It arose
as a solution to problems peculiar to the North American urban environment, but particularly that of labour shortage. New arrivals in the "instant cities" of the West could not live in lean-tos or sod huts, and there was no time to build log cabins: "People urgently needing shelter were slow to believe there was only one way to build; nor were they convinced that a simpler way was dangerously flimsy . . . a speed-minded and economy-minded people were willing to be satisfied with 'lower' standards." 30

Much of the initial reluctance of residents nostalgic for traditional houses of heavy timber and brick was soon dispelled when balloon framed houses proved not only to be stronger and more durable than their predecessors, but more resistant to rot and decay caused by moisture accumulation in mortise-and-tenon joints. But there was an inherent danger in cities of densely-packed and hastily-erected balloon frame buildings which was not fully appreciated until October of 1871 when Chicago, in one of history's most perverse ironies, was almost totally destroyed by a conflagration that fed on the very lightness of the building form that had made the city's existence possible. Because of the light, matchstick-like quality of balloon framing, it proved far more susceptible to fire than earlier building forms, giving rise to the present description of late nineteenth century Western urban centres as "cities of kindling." Why this cycle of destruction and rebirth continued unabated for almost five decades after the Great Chicago Fire is dealt with in subsequent chapters.
Masonry Construction

The erection of structures in stone and brick is far older than any other form of durable building, and reached a highly developed level during classical antiquity. During the early years of North American architectural development, masonry was the dominant material for large governmental, religious and commercial buildings for formal and symbolic as well as structural reasons. Before the advent of steel framing, masonry techniques little changed from classical times were the only means of enclosing large interior spaces, utilizing the complex domes and vaults perfected by Greek and Roman architects. These principles of masonry construction had been codified in mathematical form in 1485 by the Italian architect Leone Battista Alberti; the subsequent development of more elaborate domes by Renaissance and Baroque architects gave the nineteenth century builder a well-developed precedent to guide him in the erection of classical traditional masonry buildings.31

Further discussion of the technological contributions of North American architects and, more importantly, engineers, to pure masonry construction of large government buildings and churches is peripheral to the study area, however, for by the time the West Coast was ready for such buildings, pure masonry had been superseded by iron and steel framing. There were two major contributions of this era to regional architecture: first and most obvious, the increasing size of these buildings in conjunction with the popularity, especially in the United States, of Greek and Roman styles, pushed pure masonry construction to its maximum physical limits, and thus initiated the search for a superior structural system that would culminate in the perfection of the steel frame; secondly, the overwhelming popularity
of classical architecture for public and ecclesiastical buildings meant
that these styles would often be recreated in large wood frame buildings
on the Northwest Coast with often disastrous results.

Large commercial blocks of masonry and timber proliferated after 1810,
as earlier noted. These vernacular buildings increased steadily in size
through the century as the demand grew for more urban floor space for
offices, stores and industry. The expansion in size was seldom accompanied
by any sort of structural innovation, but rather by the simple expedient of
increasing the thickness of the exterior bearing walls to support more and
more interior volume and more stories. By mid-century, the size of these
buildings had reached a point where any further increase in the thickness
of the wall encroached to an unacceptable level on the interior space, thus
creating a technological impasse that was to speed the development of the
metal-framed, curtain-walled "skyscraper."32

The use of brick or stone for house construction, while commonplace in
Europe, was relatively rare in North America for reasons previously sug-
gesed. The most common form of masonry in residences in the New World was
usually a brick or stone veneer applied to a timber frame, and in the
Middle Colonies, New England and Upper Canada, such houses became popular
during the early nineteenth century. Only in Quebec and parts of German-
settled Pennsylvania did stone masonry persist for houses and barns; beyond
these areas, the timber frame prevailed. Not until after the arrival of
the transcontinental railroads on the North Pacific Coast do we begin to
see masonry used for houses, and even then it was only in the homes of the
very wealthy.
Early Iron and Steel Construction

The adoption of cast iron as a building material "initiated the most profound and far reaching revolution in the history of the building arts," noted historian Carl Condit, who ascribed to this event two significant trends: first, the physical characteristics of cast iron--its strength under compression, tension and shear, its elasticity, and its resistance to combustion--allowed the size of the North American building to be drastically increased and its form radically altered; second, the advances in the sciences of engineering and metallurgy necessary for this step forever removed the construction of large buildings from the arts and crafts category to a branch of theoretical and applied science. 33

The great age of iron construction began in England during the Industrial Revolution of the late eighteenth century. By 1800, the use of the internal iron frame for mills and factories was widespread, owing largely to the influence of builders Matthew Boulton and James Watt. The rapid adoption of the iron frame resulted in a number of structural collapses during the early nineteenth century because of a lack of scientific understanding of the behaviour of the medium under stress, and it was not until the 1850's that a combination of French mathematicians and English builders solved the major problem by substituting wrought iron, with its superior tensile strength, for cast iron in horizontal structural members. In North America, "non-scientific," pragmatic builders still operating in an arts and crafts tradition were responsible for a horrendous rash of building and bridge failures, and sensationalistic newspaper accounts of these were a staple item until after the Civil War. 34
In North America, the impetus for iron framing came from two necessities: the first was the need to enclose a larger interior volume of space than was technologically feasible with pure masonry, or wood and masonry construction; the second was the need to protect the structure from fire. That these two reasons were at least co-equal is suggested by the fact that many early iron framed buildings, such as the Philadelphia Gas Works (1837), were functional only if non-flammability was the major design criterion. Philadelphia was, in fact, the leading colonial city in terms of iron frame development, but was gradually overshadowed by New York in the late 1840's, when a series of disastrous fires on the lower East Side forced New York builders to turn to iron in place of heavy timber framing. This is the earliest suggestion of a theme that will reappear in subsequent chapters: areas of rapid urban growth were forced to make rapid technological progress to defend against the fire hazard.

Virtually all of the iron components of early iron frame buildings in North America were manufactured locally but, as was the case with other building media, by mid-century the process had been industrialized. The revolution in iron beam and column manufacture was largely attributable to the New York architects James Bogardus and Daniel Badger. Bogardus had travelled extensively in England from 1836 to 1840, specifically to study iron construction methods, and was responsible for introducing the now-universal I-beam to the United States and Canada. Between 1850 and 1870, Bogardus and his chief competitor Badger erected scores of iron framed buildings in New York City, spawning a host of similar efforts in other major Eastern cities, and also creating a great demand for standardized iron structural members for use in large buildings.
The iron-framed buildings revolutionized the urban core of major North American cities, and persisted until the 1880's when the newer steel-framed construction techniques began to give birth to the earliest examples of the skyscraper. In spite of the superiority of iron over masonry and timber frame construction, it too exhibited certain drawbacks. Foremost among these was the fact that the bolted iron frame was structurally incapable of supporting more than five or six floors because of the lack of adequate bracing for wind loads; even more important, iron structural members—unless protected by insulating masonry—bent and stretched in the intense heat of a building fire, leading to unacceptable structural deformation or outright collapse.

The shortcomings of cast and wrought iron in conjunction with the invention of the Bessemer and Siemens-Martin metallurgical processes in the 1860's opened the way for the use of structural steel instead of iron for the internal frame of large commercial and industrial buildings. The earliest North American example of this type of steel cage construction was Chicago's Home Insurance Building, built in 1884-1885 by architect William Le Baron Jenney. That the forerunner of the modern skyscraper should have emerged from the great architectural crucible of the prototypical frontier metropolis was no accident, for the technological relationship of the balloon frame and the steel endoskeleton was implicitly direct:

... when steel structural shapes began appearing in quantity ... the transition from wooden to metallic members was rapid and easy. Heavy-mill construction of timber; the wooden truss; and the frame house ... had long been basic structural forms. They had channelized American technique and it was entirely logical that iron or steel columns and beams be at first treated as merely improved replacements for the wooden prototypes ... it was in such systems as the balloon frame that a clear differentiation had been made between supporting skeleton and enclosing skin.
The superiority of steel for urban construction goes beyond its relative strength or resistance to fire, however, for structural steel was the first perfectly isotropic building material. (The characteristic of isotropism is defined as the ability of the medium to react identically in all directions from a given point of stress, whether load or heat.) Natural materials such as wood or stone do not react in this manner because of their cellular, crystalline or fibrous structure, nor do they react under load with any predictable consistency due to their natural flaws and impurities. The adoption of the steel frame for urban construction completed the removal of the art of building from its basis in tradition and craft, and placed it into the realm of the mathematician and engineer. For the first time in architectural history, it had become possible to analyze the problem of structural strength and efficiency theoretically, and in advance of actual construction. Furthermore, it allowed the achievement of strength through precision rather than sheer mass. The significance of this breakthrough is perhaps best appreciated when viewed in light of the fact that this structural system is still the predominant one in use at the present time.

Conclusions

The preceding discussion has sketched the essential historical outlines of the transfer of European building technology to the North American continent, and its subsequent modification by factors which were cultural, technological and environmental. At this point, some distinctive trends within these categories should be described and, where necessary, linked with the larger corpus of geographical thought.
The cultural imprint of transplanted European building forms was most obvious on the coastal margins of the North American colonies, in what Wilbur Zelinsky termed "The Doctrine of First Effective Settlement." That the early colonial nodes so distinctly represented the culture of the initial settlers is undeniable; but what is more to the point is that during the subsequent expansion of European settlers into previously unsettled areas west of the original nodes, the British cultural ethic became predominant. Only in French Quebec and the Spanish/Mexican Southwest did significant elements of other colonial cultures survive; elsewhere, "antecedent cultures were simply pulverized under the massive Anglo-American avalanche, leaving little more than a few ruins, place names, and archaic grant boundaries, and some items of agriculture and animal husbandry."  

Cultural geographers, particularly Kniffen, Glassie and Lewis, have identified five major architectural zones originating in the colonial east, and all ultimately reaching the West Coast. The one most pertinent to the North Pacific Coast study area was the New England stream of vernacular building, which spread west via Ohio, Indiana and Illinois, then leap-frogged to Puget Sound in the 1850's. But by the latter part of the century, virtually all construction, whether public, commercial, residential or industrial, was done in a purely North American idiom with only superficial traces of decorative elements to suggest the cultural background of the builders.

The North American environment was the most powerful levelling force in what R. C. Harris has termed "The Simplification of Europe Overseas," and most cultural differences during the nineteenth century rapidly paled as access to free land created a remarkably homogeneous and egalitarian society. The pull of frontier resources--especially land--prevented the
recreation of the European labour system, as Turner had first noted in 1893; therefore, a stratified society similar to Europe could not occur until the end of the frontier.

But the most important aspect of simplification to be considered here was that, in North America, technology was simplified along with other elements of society. Lightness and simplicity were the hallmark of American industrial design: American steamboats were functional, but ugly to European eyes; American locomotives were much lighter and more "flexible" than their English counterparts; virtually every woodworking mill was a visual blot on the landscape; and most American houses were wood reproductions of the stone and brick styles, including Georgian, Gothic and Tudor, then popular in Europe. That flimsiness and a temporary appearance were characteristic of American buildings, whether residential or commercial, was widely acknowledged; John Ruskin observed that it was an "evil sign" for people to build a house to last only one generation.41

Regardless of the source of foreign concern about simplification, the environmental common denominator for every aspect of North American building was the use of wood, the most democratic of all building mediums. The foremost native American architect of the eighteenth century once observed:

The private buildings are very rarely constructed of stone or brick; much the greatest proportion being of scantling and boards, plastered with lime. It is impossible to devise things more ugly, uncomfortable and happily more perishable.42

That Thomas Jefferson's impression could be so appropriate even a century after he recorded it is of paramount significance in dealing with the historical origins of "cities of kindling."
CHAPTER 2
NOTES


2. Ibid., 13. It is ironic that many aboriginal practices, including multi-family housing and the adaption of shelters to regional and micro-climates would have to be tediously relearned.


5. Ibid., 3.


15. Ibid., 2.


20. Rempel, Building with Wood, 118.


22. Ibid., 529.


24. Ibid., 41.

25. Ibid., 41.


31. Condit, American Building, 64.

32. Ibid., 71.


34. Ibid., 79.

35. Ibid., 81.


CHAPTER 3

A HERITAGE OF FLAME: URBAN FIRE CONTROL BEFORE 1850

Two types of fire are recognized in the American environment: natural fire and human fire. Note that this distinction rests solely on the genesis of the flame, for fire behaves like any other natural phenomenon. That is, it occurs in response to certain immutable natural laws related to varying levels of fuel, oxygen and temperature. Therefore, the degree to which fire is a determinant in the formation of natural and cultural landscapes is largely a question of the relationship of natural versus man-made fire.¹

Natural fire existed in the North American landscape eons before the arrival of the first humans. Its origins were simple, as Walter Hough suggested in 1926: "... volcanic, chemical, electrical, frictional due to earth movements, and frictional on wood."² By far the most common of these is electrical, or ignition by lightning (although volcanic activity in the heavily forested Pacific Northwest is not to be totally ignored). Furthermore, Stephen Pyne has observed that, prior to the arrival of the first humans, virtually every corner of the North American continent had been penetrated and, to some extent, modified by natural fire.³

Manmade fire in North America had two geographically and temporally distinct origins, which Pyne graphically describes as "The Fire From Asia" and "The Fire From Europe."⁴ The former refers to the knowledge of fire as a tool for agriculture and hunting brought from the Asian hearth of
human civilization. This immigration of man and fire superimposed a new and extensive fire regime over the existing natural one, and virtually every aspect of North American Indian civilization was based on the mastery of fire.

The first Europeans to arrive in the New World not only "carried the torch" of western civilization, but liberally applied it to their surroundings as well. As these new settlers entered unfamiliar fire regimes (i.e., a particular environment of fuels, topography and climate combined with a consistent pattern of ignition), they began to consciously modify their surroundings using fire, the most powerful landscape-alteration tool in their technologically-limited colonial "tool kit." This process was simply a geographically-removed continuation of the "Great Reclamation": the assault of agriculture on the forests, swamps, estuaries and moors of interior Europe that had begun at the time of the crusades. But the cycle was tremendously accelerated in the New World, for what took almost two millennia to accomplish in Europe was done in less than two centuries in the United States.5

The combination of aboriginal and European fire practices exchanged and transformed the natural fire regions of North America on an almost continuous basis, fluctuating in accordance with both natural climatic change and cultural changes occasioned by migration and technological evolution. Where the thrust of Asian fire had generally been to replace forests with grassland, the impact of European fire was to replace grassland with either farms or to let it revert to forest. But an even more fundamental change was wrought upon North American fire regimes by the advent of the Industrial Revolution, beginning in the early nineteenth century. In his 1956 study, "The Agency of Man on the Earth," Carl Sauer
suggested that use of wildland fire was a feature of primitive societies, while fire suppression was a characteristic of only "civilized" or industrial ones. Urbanized societies have always had to contend with the problem of fire control, even in classical times, but it was not until the beginnings of the urban/industrial revolution that fire prevention and suppression became urban institutions.

Fire Prevention: Early American Fire Laws

The transfer of an established, primarily Northern European society to the shores of the North American continent has previously been described as a "wrenching experience" in terms of material culture, particularly architecture and building morphology. The same is also true for European fire experience, as settlers left familiar fire regimes for often unfamiliar ones. While the natural fire regimes of New England and the St. Lawrence Valley were not as drastically different from Europe as those of the southern colonies, the constant threat of fire from either accidental ignition or Indian attack was a presence that had no European counterpart. The fear engendered by this dual threat may seem remote and unreal to the modern mind, but it was to colour colonial and frontier thinking for two centuries. Most important, it was part of the "cultural baggage" carried to every corner of the continent.

Of all the North American "cultural hearths," New England is of central importance to the formation of colonial and early national patterns of fire response in both Canada and the United States. Most of the fire regimes typical of North America were to be found in the region during the seventeenth and eighteenth centuries, so there was a tendency for initial
adaptations to the fire hazard in New England to be carried west by succeeding waves of settlement. The flow of this settlement is also of interest, because the thesis study area—the Puget Sound Lowland—has very strong cultural ties to New England, a point to be elaborated upon in following chapters.  

Probably the earliest attempts at fire prevention in the North American colonies derived from laws created to control the use of fire for hunting purposes, for the firing of woodland and brush was the easiest way for a technologically limited frontier society to flush and kill valuable game animals. Few early fire codes were vigourously enforced, however, for the restricted use of destructive wildfire was deeply ingrained in the European mind and, further, such burning had the additional advantage of clearing land for agricultural purposes. The first fire code of the Massachusetts Bay Colony, created in 1631, was typical of many later such laws in that it merely restricted the use of such fires to certain seasons of the year. In short, fire in rural colonial New England was viewed as beneficial rather than a dreaded foe, and a prevalent belief was that the threat of uncontrolled fire would gradually disappear as the volatile landscape of wild fuels was replaced by the less flammable fuel complex of domestic flora and fauna.

As settlement spread inland from the coastal and riverine population nodes, wildfire came to be a threat to remote towns and villages. European custom dictated assistance with all community-threat fires, and this later acquired statutory force: for example, three New York counties entered a wildfire compact in 1743 which made any available person subject to call as a firefighter. This law was extended to the rest of the colony in 1758, and by the turn of the century had inspired similar laws in other colonies.
Settlers moving west from New England into Upper Canada and the trans-Appalachian frontier carried their fire prevention practices with them just as surely as they carried religious revivalism and a host of other Yankee "-isms," and the "Burned-over District" of central New York--the most famous seedbed of nineteenth century religious fervor--was recreated many times over. Furthermore, the parallel between "burned-over" as a physical as well as cultural description of a frontier landscape is to be noted.

While the focus of this study is on urban rather than rural fire, the significance of early North American attitudes toward wildfire cannot be overestimated. Despite the almost immediate creation of towns and cities, particularly in the coastal areas, the need for subsistence farming and, hence, land clearing, within the confines of the preindustrial city as well as without, meant that the earliest stages of urban growth during the colonial or frontier period were virtually indistinguishable from settlement in more isolated areas. Almost all early fire laws were aimed at the prevention of destruction of human habitations, whether urban or rural. It is most instructive to note that the first laws intended to prevent fire from destroying uninhabited wildland were not passed until 1886, for the protection of Yellowstone National Park.

The fire hazard had an early and visible influence on the design and construction of buildings in North American cities. Although most structures were simply recreations of seventeenth century European buildings, the often drastic differences in climate and available materials created a new fire regime which, in turn, required modifications to reduce the increased fire hazard.

One of the best examples of this process was the transfer of the English thatched roof to the Massachusetts Bay Colony in the early 1620's, and
its subsequent legal banishment in 1629 because of the fire danger. The climatic necessity of having an interior instead of exterior chimney, the lack of brick for proper, well-insulated fireplaces and chimneys and the need to keep a relatively hot fire much of the year caused untold grief and destruction during the early settlement period, and within a decade the thatched roof had been outlawed in most towns. Even so, the steeply-pitched roofline characteristic of thatched roofs was retained, and persisted well into this century as a feature of New England revival house styles.

The thatched roof was replaced by the wood shingle, or "shake," during the later seventeenth century. Some architectural historians have suggested that these hardwood shingles were inspired by the fashion of using Dutch tile for walls and roofs in Jacobean England, but there was also a long Anglo-Saxon tradition of using oak shingles. In any case, the hardwood shingle proved an ideal roofing material: inexpensive, widely available and reasonably fire-resistant, and was utilized throughout the eastern colonies. It was not until New Englanders moved into the coniferous forests of the Great Lakes and Pacific Northwest that shingles made of resinous softwood became a major fire hazard.

Some building techniques were used in the New World despite having been banned in Europe. The characteristic jetty, or second floor overhang, of the Elizabethan house was outlawed as a fire hazard during the Jacobean period (1603-1625) in England. However, such houses frequently appeared in rural areas of the Northeast, where the advantages of the jetty for defending the house against Indian attack have given this structure the generic name of "garrison house." The original function of the overhang was not to serve as a frontier blockhouse, of course, but rather to provide more floor space in crowded Elizabethan cities.
All other architectural details aside, there remains one characteristic of early fire prevention legislation which was common to all New World colonies: concern for chimney fires. Virtually all New England households kept a water bucket in the loft by the chimney, a need required by common sense as much as the law. In urban areas, households were also required to have a ladder for immediate access to chimney fires that could threaten an entire neighbourhood, and wooden ladders were often permanently affixed to the steeply pitched roof to allow access to the chimney from the upper windows.

Fire Suppression: The Volunteer Fire Department

Few institutions were to affect the formative years of the typical North American town or city so profoundly as the organization and capabilities of its volunteer fire department, but this contribution has been largely ignored by most urban historians and geographers. Even today, only ten percent to fifteen percent of the firefighters in the United States and Canada are full-time professionals, with the balance either part-paid or, most often, not paid at all. The latter case predominates, as might be expected, in rural areas.¹⁵

Historians of firefighting in the United States are fond of suggesting that the volunteer fire company was a "characteristically American institution," one which was usually formed by concerned individual citizens rather than a governmental body, and one that most frequently was self-governing, establishing its own rules and electing its own officers.¹⁶ One of Alexis de Tocqueville's better known observations supports this contention:
Americans of all ages, all conditions, and all dispositions constantly form associations. They have not only commercial and manufacturing companies, in which all take part, but associations of a thousand kinds... to give entertainments, to found seminaries, to build inns, to construct churches, to diffuse books, to send missionaries to the Antipodes; in this manner they found hospitals, prisons and schools... whenever at the head of some new undertaking you see the government in France, or a man of rank in England, in the United States you will be sure to find an association.17

The first volunteer fire company in North America was founded in Boston in 1679 to use the continent's first "fire engine," a primitive hand-pump imported from England. This group was superseded in 1717 by the Boston Fire Society, a group of twenty men who not only fought fires but brought large bags to salvage goods from threatened buildings. This approach to urban fire control was modeled on a system in use in New Amsterdam and, when examined in conjunction with the initial success of the Dutch settlement on Manhattan Island, suggests that they were the leading practitioners of urban fire control in colonial North America.18

However, it was to be Philadelphia rather than New York or Boston which became the model for volunteer fire departments. Due largely to William Penn's foresight in urban planning, Philadelphia remained relatively safe from major fires until the mid-1700's; after this it was due to the efforts of Benjamin Franklin that it remained so. Franklin's incessant needling about fire safety in his newspaper, the Philadelphia Gazette, kept residents constantly aware of the potential danger. In 1763, he founded a volunteer fire department modeled on that of Boston. This organization, the Union Fire Company, served as the prototype for virtually every other North American fire company.19

By the time of the American Revolution, most of the larger colonial cities had at least several volunteer fire companies. Not only were
prominent residents of the city instrumental in organizing and equipping these companies, but they were also among the earliest and most constructive members. Franklin observed that in Philadelphia, fire companies were not only numerous but also included most of the inhabitants who were "men of property." One such group--the Hand in Hand Fire Company--included several leading physicians, the rector of Christ Church, the mayor, the provost of the College of Philadelphia, and a number of wealthy merchants. As previously noted, many of the leaders of the 1776 Revolution got their political starts and honed their organizational skills in colonial volunteer fire companies.20

In the years following the Revolution, the composition of the volunteer fire departments began to change. Not unexpectedly, these changes reflected the rapid growth of the cities, the increasing complexity of firefighting equipment, and the tremendous influx of new immigrants from Europe. Although the first two of these points may seem obvious, the third requires some amplification, for it is intimately related to the politicization of the urban fire department.

By the middle of the nineteenth century, large urban volunteer fire companies had ceased to be exclusive clubs for wealthy businessmen; instead, they had become much more working class in composition, and were organized along religious and ethnic lines. They retained their democratic structure, however, and in many cases evolved into a sub rosa political organization based on wards, precincts and neighbourhoods. The extent of their political influence is perhaps nowhere better demonstrated than in the case of William "Boss" Tweed, a Scottish immigrant who parlayed a position on New York City's Engine Company #6 into the leadership of the Tammany Hall ring, the epitome of the nineteenth century urban political machine. The basis for the graft
and patronage was the interlocking control of a large part of the volunteer fire department of New York City.\textsuperscript{21}

Also related to politicization and graft were the increasingly ethnic lines long which most urban fire companies were organized. Various companies had always been highly competitive, racing to fires and vying among one another for the honour of saving lives and property, but by the 1830's, drinking, hose-slashing and brawling were becoming commonplace at major fires. Earnest ascribes the origin of many of the first paid fire departments to backlash of concern over street violence by volunteer firemen, most notably in New York, Philadelphia and Baltimore.\textsuperscript{22}

Firefighting Equipment

Not only were social and political factors affecting the organization and efficiency of the North American volunteer fire companies, but changes in firefighting technology as well. A brief overview of the evolution of the firefighters' equipment is instructive, not only to put events in the North Pacific Coast study area into proper historical perspective, but also because in any frontier society there is a compressed "instant replay" or technological evolution. This point, raised earlier in the discussion of building technology, was equally true of urban fire suppression technology.

The most elementary form of fire suppression is what North Americans refer to as a "bucket brigade," a descriptive alliteration for variations on a central theme: the rapid collection, passage and dispersal of water to a fire site by a hastily assembled band of unorganized volunteers using buckets or similar small containers. Such a response is perhaps one of the most universal of human cultural institutions, and was characteristic of frontier
settlements from French Quebec to Spanish Florida.

The tools required by the bucket brigade were simple: in addition to buckets—often required by law in every home—there were axes and long pikes for pulling down burning thatch. Later pieces included salvage bags for removing valuables and, especially in New England, bed keys. The latter was a special tool required to disassemble the bed frame, the most valuable possession in the colonial home.

A common characteristic of all of these items is that their use was usually directed toward saving surrounding buildings rather than those totally involved in flames. It was not until it became possible to move a larger and more steady amount of water to the scene of the fire that burning structures could be approached directly. In Europe a variety of pumping engines employing a piston and air chamber were tried, and though these were awkward to handle and operate, they were usually more effective than the bucket. Great advances were made in this area following the Great Fire of 1666 which destroyed central London, and in 1679 Boston acquired a "state of the art" British fire pump (or "engine," as they were invariably called). Because of the extreme fire danger and corresponding rapid growth of Boston, the city led the continent in the acquisition of new fire equipment, which urban leaders considered to be essential, not only to progress, but survival as well. So it was that in the same year, Boston housed its new engine in North America's first firehouse, and staffed it with the first paid fire department.\(^{23}\)

The apogee of hand-pumped fire engine evolution was the "Newsham engine," the invention of London pearl buttonmaker Richard Newsham, who was appalled at the destruction wrought by the Great Fire of 1666.\(^{24}\) By the mid-eighteenth century, most North American cities were either
equipped with imported Newsham engines, or domestic models built to similar designs. Rugged and practical, Newsham engines had long wooden handlebars called "brakes" along both sides of the pump cylinder. This allowed up to ten (and later many more) firemen to pump together in seesaw fashion, lofting a stream of water higher than most colonial-era buildings. Although largely replaced by steam fire engines in North America by the mid-nineteenth century, variations on Newsham's engine persisted as auxiliary equipment for several more decades, and even longer in the British Isles. An English historian noted that Richard Newsham had given "a nobler present to his country, than if he had added provinces to Great Britain."  

The application of machine technology to urban firefighting was a major turning point in fire control. First, it changed the focus of fire scene activity from trying to save adjacent buildings to direct attack on the source of the flames. Secondly, it made firefighting a specialized and singularly masculine vocation. While European and early colonial bucket brigades had frequently included women and children, the advent of the side-brake hand pumper would relegate them to spectators' status, for by all accounts this was a brutal and often dangerous job. Most firefighting injuries during the hand pump era tended to be caused not by fire or collapsing buildings but, rather, were mainly broken bones from attempting to relieve others on the rapidly-moving oak handlebars.  

The necessarily "macho" image of volunteer firemen of this period and their organization around such a demanding piece of equipment perhaps inevitably led to competition between crews, departments and especially nearby cities. Sporting events were frequently arranged during the summer months--especially on the July 4th holiday--that pitted firemen from different towns and cities against one another in tests of firefighting skills.
With the volunteers dressed in their colourful uniforms, these events were unquestionably the forerunner of professional intra-urban sports in North America, and further fanned the flames of urban boosterism (albeit in a more practical way than baseball or football).

A second technological revolution in urban firefighting equipment began in the mid-nineteenth century with the introduction of the steam-powered fire pumper. Although it could pump more water to a greater height, the steam fire engine encountered early resistance from North American firemen who, as a group, were rivaled only by sailors in their technological conservatism. New York's first steam engine, demonstrated with great fanfare in 1841, was considered by the city's firemen to be "an affront to their manhood," and spent the rest of its days in a box factory. Western cities proved more open to new ideas such as this, however, and the first practical steam fire engine was adopted by Cincinnati in 1852; other Ohio Valley towns followed suit, and by the end of the U.S. Civil War, virtually every major city in North America had at least one.27

The acquisition of steam fire engines, like the industrialization of other aspects of urban life, forever changed the character of city fire departments. Seldom could they be all-volunteer forces after this, for a cadre of full-time engineers were needed to maintain the complex equipment. Similarly, steam engines could no longer be manhandled through city streets, but instead required teams of well-trained draft horses who became an integral part of fire department life. Where a meeting hall and a shed had sufficed for a fire department in the past, steam engines required well-sited, multi-purpose fire stations with facilities for horses, engines, men, equipment and communications, all under one roof. It was this combination of specialized equipment and a need for permanent staffing
that would lead to the replacement of volunteer companies by paid municipal fire departments in the larger North American cities by the turn of the century.

The preceding discussion of the transition from the bucket brigade to the professional fire department brings up one final point that was (and is) critical to the control of urban fire: an adequate water system. The common thread linking firefighters throughout history, whether classical, medieval, European, colonial or frontier, has been the necessity of delivering an ample supply of water to the fire site. Once North American settlement had proceeded beyond the coastal cities, the first major urban project (after the erection of a defensive stockade) was a well, ditch or reservoir to provide a water supply.

Virtually all colonial cities, from Quebec to Charleston, initially relied on a series of municipal wells at various major intersections. These were ultimately to prove unsatisfactory for firefighting, as the conflagrations of the seventeenth and eighteenth centuries demonstrated. But it was not until the great yellow fever epidemic of the early 1800's that significant improvements were made: acting on the erroneous notion that "domestic filth" in city streets was responsible for the spread of the disease, city leaders sought means to flush streets regularly with water. Wells and pumps could not provide the necessary volume of water, so large supplies of water from outside the urban core were sought in order to prevent further epidemics.28

The city most ravaged by yellow fever was Philadelphia, and it was here that North America's first modern waterworks, designed and constructed by Benjamin Latrobe, went into service in 1798. Because of the lack of iron foundries and the ready availability of wood, most of the pipes and
mains were bored-out white pine logs. The system was obsolete before it entered service and had to be totally replaced within a decade, but it nevertheless inspired other cities. By 1800, fifteen American cities had their own waterworks.

The construction of water systems beneath city streets, whether intended originally for firefighting or not, proved a boon to the urban fire company. Instead of relying on long and awkward lines of bucket brigaders for their water supply, it became possible to concentrate on mechanizing the firefighting task with improvements in hydrants (or "fireplugs," as they initially were just that—wooden plugs in a water main), pumpers and hoses. 29

Urban Fire Control and Western Expansion

Techniques, organizations and equipment developed for urban fire control in colonial cities were prominent features of urban culture that spread into the continental interior of North America during the early nineteenth century. The direction, intensity and composition of these great cultural streams have been described by many geographers and historians, but only those having a direct influence on the study area will be considered in this discussion. As suggested in Chapter 2, the movement of construction styles and materials across the continent was accompanied by fire control experience associated with particular types of buildings; thus, western fire control was in many respects a stepchild of frontier architectural systems and theories. 30

While most seaboard colonial cities were recreations of European cities modified by the local environment and dependent on maritime linkages
to their parent cultures, towns in the continental interior evolved in situ according to the dictates of more regional criteria. Here, obsolete social systems such as feudal landholding withered away while many latent or little-used survival skills—hunting, fishing, and woodcraft, for instance—became vital. In the United States, the severance of the political umbilical cord to Britain led to the widespread adoption of a New England–based model for urban form and services, and ultimately to a truly "national style" of urban character by the mid-nineteenth century.31

Given a continent with abundant resources and limited labour, the North American collective fervor to mechanize every aspect of daily life, particularly in the mid-nineteenth century, is a central theme in historical studies of the period.32 The mechanization of North American life ranged from household tasks to manufacturing; it is the latter which concerns our theme most, especially the emerging transportation, lumber, and textile industries. In particular, it was the introduction of steam as a power source for transportation and industry that brought another constant source of fire into the urban environment.

The wrenching transition from the pastoral ideal of the late eighteenth century to the "dark, Satanic mills" and fire-breathing steam engines of the nineteenth has similarly been described. Leo Marx noted the special affinity of North Americans and their machinery, and observed that in the course of using the "raw landscape as a setting for technological progress" there occurred "a violent clash of advanced art and savage nature."33 In Europe this revolution had proceeded in a relatively structured manner within well-defined environmental and social limits; in North America, the suddenness of the application of industry meant an emphasis on profits and visible results at the expense of community safety. It was probably
inevitable that the outcome would be "cities of kindling."

As North American settlement moved westward beyond the Appalachians, Great Lakes and Canadian Shield, urban dwellers continued to face the same major problems that all urban dwellers have historically had to face: disease, crime and fire. In virtually every case, however, the need for protection from these far outstripped the communities' ability to provide it. The problem was often compounded by rapid, unplanned growth and isolation from more developed areas.  

By the middle of the nineteenth century, most North American towns had a primitive fire warning and control system, usually a volunteer department which operated in conjunction with a night watch who was also the local law enforcement officer. Despite what was often only a token effort at fire control, problems with fire accumulated much faster than these casual remedies could handle. It is impossible to give estimates of fire damage to these communities during this period but, according to western urban historian Richard Wade, it was "certainly greater than losses incurred in all other ways."  House fires and building fires were so commonplace that they received only minor notice in contemporary newspapers; apparently, only conflagrations that destroyed entire towns or cities were deemed worthy of extensive coverage by the press.

The aftermath of major conflagrations inevitably produced a surge of public support for improvements in fire control, but these usually faded along with memories of the destruction. Despite fluctuating public support, however, by 1815 most towns of the Ohio Valley had legal provisions for the prevention and suppression of urban fire. The cornerstone of fire control was a self-governing volunteer fire department which used city funds for equipment. Also by this date, a standardized corpus of fire
prevention laws was appearing. Some of the most common included:

(1) a ban on wooden chimneys

(2) no storage of wood shavings or gunpowder

(3) regulations for chimney height and stovepipe installations

(4) mandatory participation in bucket brigades to supplement the fire department (if any)

(5) buckets required to be ready and accessible in all homes and businesses.  

However noble or potentially useful these early fire codes were in their intent, they must be measured against the recurring fact that the legislation of public safety laws far outpaced their rigid enforcement.

The year 1850 marked the true beginning of urban life on the Pacific Coast, when the discovery of gold in California drew a transient crowd of wealth seekers from the East and Midwest to create almost overnight a double frontier. Although there were existing settlements in the area prior to this, including Monterrey, the California mission towns, and the northern fur trade posts such as Forts Victoria, Langley and Vancouver, the sudden influx of settlers rapidly created new metropolitan centres based on access to transportation networks rather than natural resources or arable land. By 1900, cities such as San Francisco, Portland, Seattle and Vancouver had grown into commanding urban/industrial centres with large hinterlands.

Earl Pomeroy has suggested that "The Pacific Slope is both the most Western and, after the East itself, the most Eastern part of America. No other section is more like the Atlantic seaboard and Western Europe; no part is more different; and no part has wished more to be both."  

For the most part, Easterners built the cities of the West, which in turn
drew other Easterners accustomed to city life. In the countryside, the count of Midwesterners and Southerners was higher.

As Eastern as the new urban centres of the Pacific Coast may have appeared, however, there was a fundamental difference in their growth pattern that had direct consequences on their susceptibility to fire. Because their initial settlement and early development were based on primary extractive activities—usually forestry, but also fishing, coal mining and some agriculture—they tended to be strongly dominated by the institutions of nineteenth century capitalism. In describing the parallel settlement of coastal British Columbia, E. M. Gibson observed:

This was in open contrast to the Europeanization of eastern Canada where family, church and military institutions competed more successfully with capitalistic companies in humanizing the natural environment. The difference is important because capitalistic institutions tend to stress materialism and short term goals in resource use; family, church and military institutions tend to pursue, in addition to materialism, long-term and less tangible goals.38

This observation was equally true for the Puget Sound region and its relationship with the eastern United States.

Consequently, the new metropolises of the Pacific Coast had as their central core what Tunnard and Reed called "temples of commerce" rather than the churches, meeting-houses or palaces of Eastern and European cities.39 While the subjugation of the common good and public safety where it was not compatible with commercial interests was a feature of most North American towns, this unpleasant situation was often grossly exaggerated in the Far West.

Finally, we must consider the origin of these commercial interests, whether local or Eastern, for it is here that the true origin of "cities of kindling" is to be found, as the following chapters will illustrate.
Based on the origin of dominant urban capital during the 1851-1920 study period, there have been two distinct phases, paralleled by two similarly distinct phases of relative urban fire danger.

The first phase of urban growth was one of unrestrained local capitalism, and is typified by cities like San Francisco or Seattle during their respective gold rush eras. Much of the city appeared to be temporary and, not unexpectedly, expendable. Pomeroy suggests that most early buildings on the Pacific Slope were so poorly built they could not have lasted long even without the fires that swept them, and that the erection of masonry buildings in later years was not only an admission that the city would be a permanent one, but also that "... the rates of return on trade had fallen to the point where a man might not easily recover costs between fires." This vicious cycle of boom and bust, or build, burn and rebuild, did not end until the years following the arrival of the railroads.

While most North American urban historians have paid due respect to the impact of the steam railroad on urban life in North America, in no other part of the continent was this impact more visible than on the Pacific frontier. In the decade following the arrival of the Canadian Pacific, Northern Pacific and Great Northern, a transition to industrial and commercial control from outside the region led to a total transformation in the physical appearance as well as size of these urban centres. Indeed, by 1900 their central business districts were becoming indistinguishable from any other on the continent. The following chapters will demonstrate that with huge sums of Eastern and foreign capital at risk
in local industries, office and commercial buildings, utilities and transportation systems, fire prevention and control measures previously unthinkible were adopted over a remarkably short period of time.
CHAPTER 3

NOTES


4. Ibid., 4.

5. Ibid., 124.


9. Ibid., 225.

10. Ibid., 45.

11. Ibid., 228.


16. Ibid., 1.


26. Ibid., 110-111.


29. Ibid., 315.


34. Lawrence Larsen, *The Urban West at the End of the Frontier*, 73; Wade, *The Urban Frontier*, 87–88.


36. Ibid., 92–93.


PART II

FIRE AND THE URBANIZATION OF THE PACIFIC NORTHWEST COAST FRONTIER TO 1900
In his regional analysis of North American forest history, Stephen Pyne asserted that the Pacific Northwest coastal frontier was, at the time of initial white contact, a natural environment characterized by the balanced forces of fire and water. Here extremely heavy fuel loads coexisted with a damp climate until rare periods of drought released horrendous destruction on a scale not rivalled until the nuclear age: the great 1933 Tillamook Burn in coastal Oregon is but one example. The frequency of large fires increased as white settlers moved into the area in the 1840's, but it is also to be noted that the Indians burned on a regular basis as well, especially in areas of concentrated native populations.¹

Industrial logging had been the source of unprecedented holocausts in the Great Lakes states, and fire was a visible medium expressing the tensions in the transition from an agricultural economy to industrialism. A true industrial logging era did not arrive in the Pacific Northwest until after 1900, so the greatest forest fires of the region were to occur in the present century. But by the early 1840's, tiny urban spearheads containing the seeds of later industry were appearing along the North Pacific Coast. The result was that the great fires of this region's agrarian-industrial metamorphosis were urban conflagrations rather than wildfire. The secret of urban survival on the coastal frontier was to make the difficult transition from forest clearing to commercial metropolis by either suffering as few conflagrations as possible or, as was the case with Seattle, having it occur at a point in the city's economic growth where it actually served to
simultaneously destroy an obsolete frontier urban core and regenerate more modern growth.

American settlements on the inland waters of the North Pacific Coast displayed an almost uncanny resemblance to one another in the early years of their urban lives, owing largely to the fact that virtually every one began as a tidewater sawmill town. Some, like Seattle and Tacoma, grew to maturity as diversified regional centres, while others have disappeared altogether. Between these extremes lie smaller cities such as Bellingham, Everett and Port Townsend, where the initial presence of sawmills at the beginning of settlement was directly responsible for their subsequent diversification as centres of agriculture, fishing, mining, or other endeavours.²

Kenneth Erickson's 1965 dissertation on the morphology of Pacific Northwest lumber settlements suggested that the mid-nineteenth century lumber industry gave these tidewater towns "a visual character which cannot be erased by time or functional change," and that it is their ". . . morphology which defines and leads to an understanding of that character."³ Implicit in this urban character is the simple fact that all of these communities were, in their earliest states at least, "cities of kindling," and that vestiges of this dangerous evolutionary phase remain to be seen in all cities in the study area.

The origins of the urbanization of the coastal regions of the future state of Washington lay in the explosive growth of San Francisco after the 1849 gold rush. Not only were large amounts of lumber needed for expansion, but the frequent occurrence of major conflagrations in San Francisco's first decade meant that rebuilding was as significant as initial construction. Lumber prices of $100 per thousand by 1850 triggered a secondary
rush for the "green gold" of Puget Sound, where all that was necessary was enough capital to build a sawmill and a deepwater access parcel of shore-line to build it on.⁴

The following section will consider four of these tidewater milltowns: Seattle, Port Townsend, Bellingham and Tacoma. All were founded by individual capitalists, shared a common lumber town morphology, were settled mainly by New Englanders, experienced the "booms and busts" of one-industry towns, and burned themselves to the ground at regular intervals. Three of these were to become the largest cities in the western part of the state because they were able to make the transition from tidewater to rail oriented economies. Thus they became more closely linked to a national financial network which discouraged the periodic destruction of urban-industrial assets. Port Townsend, the city that failed to make the railroad transition, is of interest primarily as a fossilized 1890's-vintage urban node where few of the twentieth century's responses to urban fire could be economically implemented.
INTRODUCTION

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CHAPTER 4

SEATTLE

The first settlement of what was to become the city of Seattle occurred in November of 1851, when a party of twenty-two men, women and children was disembarked at Alki Point. This group was led by Arthur Denny who, like the rest of the members, was an Ohio Valley native whose family had been moving progressively westward from New England for several generations. The Denny party had come originally to Oregon in a wagon train from Missouri, but was diverted to Puget Sound by stories told in Portland about the fertility of the land, the mildness of the climate and, most of all, the commercial possibilities of trade with San Francisco.\(^1\)

The most compelling reason for migration to Oregon for most Americans was the opportunity to acquire 640 acres of free land for a man and wife under the 1850 Oregon land law. The intent of the law was to provide agricultural land, but even though the Denny group intended to farm initially, the choice of a future natural railroad site at the easternmost point on Puget Sound, halfway between existing settlements at Port Townsend and Olympia and on a natural harbour ringed with dense timber suggests that commercial possibilities were the primary consideration. The point that an agrarian group with little or no urban experience was about to design a city is also to be noted.

The exposed position of the original settlement—called New York Alki (the latter word was Chinook for "by and by!") by their optimistic leaders—was abandoned the following spring and a superior site on the east side of Elliott Bay was chosen. Here cabins were raised in separated
clearings to satisfy the requirements of the land claim law, and a lively trade was begun cutting logs for sale to passing sailing vessels in exchange for food and other necessities.²

The entire character of the fledgling community was to soon change abruptly, however, for in October of 1852 there arrived from San Francisco one Henry Yesler, an entrepreneur with financial backing who was looking for a site for a steam-powered sawmill. Yesler chose the Seattle location because it was less expensive than any of the upsound sites he had examined, and one or two days closer to San Francisco. But, best of all, several of the original settlers adjusted their claims to allow him a waterfront parcel for the mill. The steam machinery arrived early in 1853, and by March the mill was cutting lumber. Even though water-powered mills at Olympia and Whatcom (Bellingham) preceded Yesler's, his was the first steam mill in the region and its superiority in lumber production was to ensure Seattle's early lead in the urbanization of Puget Sound.³ Lumber from Yesler's mill also had implications for Seattle's morphological development, for it made possible the construction of numerous types and styles of buildings besides simple log cabins.

**Urban Morphology and the Fire Hazard**

The importance of the earliest phases of urban settlement cannot be over-emphasized, because once certain urban patterns are in place, they rarely undergo any major change. As Phillip Bacon has noted,

> Cities . . . are the product of time. Once the frame of streets and buildings in which the life of the city goes on are fixed in place they are typically little altered. The early economic stimulants, as well, are with us today; perhaps in new forms, but certainly not missing from the landscape.⁴
MAP 2: SITE OF SEATTLE SETTLEMENTS, 1851-1852.
The exposed position at Alki Point (A) was abandoned for the east side of Elliott Bay (B) in the spring of 1852.
(Detail from U.S. Exploring Expedition, "Elliott Bay, Admiralty Inlet, Oregon County, 1841," (Center for Pacific Northwest Studies.)
When we consider that, of our three major morphological components, land use changes slowly, buildings change slower still, and street patterns change hardly at all, then the importance of initial settlement patterns can be appreciated. Thus, the answers to why Seattle and her sister communities were "cities of kindling" are to be found in an examination of the early growth and morphology of the town, especially the central business district.

During the first two decades of Seattle's urban life, Yesler's sawmill was the fire-breathing heart of the city: almost everyone either worked in the mill, which at periods of peak demand ran two twelve-hour shifts per day, or at least sold timber to it as residents steadily pushed the treeline back from the beach to build homes, businesses and small farms. Smoke and fire were a daily presence in early Seattle: a huge bonfire of mill waste burned constantly, while during spring and summer months a perpetual haze from clearing fires up and down the Sound blanketed the city.

The street pattern of Seattle was essentially the ubiquitous Philadelphia grid so long favoured by American settlers. The hilly topography made portions of downtown very awkward to travel in, however, and the offset of the grid north of Yesler's mill to parallel the shoreline further complicated matters. But, in any case, it was a familiar system and allowed reasonably orderly growth out from the urban core.

The earliest residences in frontier Seattle were simple log cabins with cedar shake roofs, heated by fireplaces built of logs and clay. Since each settler had to live on his own claim, these were dispersed throughout the surrounding forest, although they were as close together as the donation claim boundaries allowed. This form of building had been perfected by preceding generations of trans-Appalachian settlers.
to the point where it was relatively immune from accidental destruction by fire. Although reliable records are nonexistent, it may safely be assumed that the primary threat to the survival of such buildings was a chimney fire, followed closely by out-of-control clearing fires or deliberate destruction by Indians.

As might be expected, it was around the sawmill that Seattle's first residential "suburb of kindling" arose. Seattleites demonstrated a strong preference for frame houses and, as soon as Yesler's mill began cutting lumber in the spring of 1853, Seattle became a settlement of virtually all wood-frame construction. Still, the fire danger in residential areas--chiefly the area to the east, or uphill side of the mill--was low because of the large donation-claim land parcels, which allowed gardening and the raising of livestock within the city centre. An examination of the earliest photographs of these homes suggests that they were heated by a combination of cast iron stoves and masonry fireplaces and chimneys. Brick was to remain too expensive for any other type of residential use until after 1900, and because of the lack of suitable clays for local manufacture, most early brick came from Eastern seaports as ballast in lumber ships.

Prior to the late 1880's, Seattle's early residential styles were architecturally undistinguished. House types and plans were initially similar to those found in the Midwest, especially the Ohio Valley, from whence most of the first settlers had come. Most houses were initially rectangular boxes with simple gable roofs; as families and businesses grew, wings, lean-to's, upper floors and decorative trim were added. Unlike their midwestern counterparts, however, these early Seattle residences were constructed of the more flammable local softwoods such as red cedar and Douglas fir, and
were roofed with split cedar shingles—a distinct contrast to the predominantly hardwood construction of the Eastern states.

There was initially little difference in commercial and residential buildings in early Seattle, and many of the first general stores began operation in residential cabins with supplies of merchandise brought up from San Francisco. The original central business district began on Commercial Street in 1854 when Arthur Denny's supply of goods outgrew his two-room cabin. He erected a twenty-by-thirty-foot frame building on the corner of Washington Street that summer, and within a year three other stores were built on the same block. By the early 1860's, when photographs of the community became commonplace, the central business district was distinguished chiefly by its clustered appearance and the ubiquitous false-front street facade which, from ground level, lent an air of eastern urbanity to what were essentially one- or two-storied gable-roofed wood-frame boxes. In addition to the close spacing of buildings, their flammable cedar walls and roofs and often volatile inventories of merchandise (ship's stores, paints and explosives in particular), all were linked by cedar plank sidewalks. While these functioned to provide access along the muddy, unpaved streets, they could also be compared to a system of fuses linking explosive charges. This problem was compounded west of Front Street where many of the buildings stood on pilings over the tideflats.

But, regardless of the commercial district's potential for fiery disaster, the community's most obvious fire hazard was the industrial area around the sawmill. Built on pilings at the foot of Mill Street—later renamed Yesler Way, but forever famous as the original "Skid Road"--the mill was of medium-weight timber construction with light clapboard siding. In addition to the boiler fires and slash burning, a 60-foot smokestack
showered the surrounding workers' housing, hotels and stores with cinders and, in 1913, when the mill site was excavated for a new sewer, there were seventeen feet of sawdust under the existing buildings.\textsuperscript{12}

\textbf{Early Fire Experience}

Seattle's first brush with the threat of total destruction by fire came very early in the settlement's existence. Although there had been minor instances of friction with the Indian tribes of the Puget Sound region since the arrival of the first white men, relations had remained unruffled until, ironically enough, the signing of formal peace treaties by tribal leaders and territorial governor Isaac Stevens in 1854 and 1855. By signing the treaties, the Indians effectively relinquished title to most of their lands, retaining only several thousand acres and some nominal payments of trade goods and money.\textsuperscript{13} Soon afterward, realizing just how little land they had left, and concerned by the increasing influx of white settlers into Puget Sound, not to mention their "buoyancy and confidence . . . [and] their spirit of conquest and of racial supremacy . . . ," the local Indians were incited to a series of uprisings during the fall of 1855.\textsuperscript{14}

While most of the violent incidents occurred inland in the White River Valley, the effect upon the exposed village of Seattle was immediate; settlers from surrounding farms fled to town for protection, a Navy vessel, the U.S.S. DECATUR, was called to Elliott Bay, and construction commenced on a stockade to enclose the commercial district. Seattle's fears were well-founded, for in January 1856, the town was attacked by a force of some 750 Indians, many of whom had been recruited for the occasion from the more warlike tribes from east of the Cascades. Although the assault was
FIGURE 1: View of Yesler’s Mill from intersection of Front Street and Mill Street (later Yesler Way). Note the rough wood frame construction and the cloud of smoke from the mill stack. (University of Washington Library, Photograph Collection.)

FIGURE 2: The 1853 Felker House Hotel, Seattle’s first hostelry. This wood frame building was essentially a scaled-up farmhouse with a decorative veranda. (University of Washington Library, Photograph Collection.)
ultimately broken by the combined fire of the embattled townsmen and the cannon of the DECATUR, the retreating Indians burned and looted virtually every cabin in the hinterland, increasing Seattle's population overnight by some forty families. Despite the successful defense of the commercial core of the city, the Indian War of 1856 was to have a negative effect on Seattle's growth: by the spring of that year the population had dropped from 250 to less than 100, and a decade passed before the agricultural hinterland was restored to its former importance.15

The threat of fire attendant to the Indian attack was to similarly have far-reaching implications on Seattle's morphology and capability for dealing with fire. First and foremost, the central business district would remain confined within the perimeter of the old stockade until the railroad boom of the 1880's. This produced a crowded and compact business district surrounded by a buffer zone of residences and open farmland out to the treeline at the edge of settlement. In addition, the para-military organization of male settlers that successfully defended the town in 1856 was retained as the core of what would become the first volunteer fire department, although it must be noted that during the actual hostilities, it was the women and older children who were charged with bucket brigade responsibilities should a fire begin within the compound.

The economic downturn in the Puget Sound region begun by the sporadic Indian Wars of the 1850's was further compounded by a decline in the San Francisco lumber market and, after 1861, by the Civil War. Seattle lost a spirited competition with Olympia for the site of the territorial capitol buildings, but was compensated in 1861 by being chosen as the location for the new Territorial University; in addition, there were also major coal discoveries in the nearby Green River Valley. By
The primary effect of the Indian War of 1856 was to confine the business district to the small peninsula south of the barricade along Front Street. (University of Washington Photograph Collection)
the early 1870's, Seattle was again growing steadily, although growth was punctuated by frequent booms and depressions in its two primary industries, lumbering and agriculture. In 1872, the population exceeded 2000 people working and living in 575 buildings. While perhaps 50 of these were only barns or stables, there were 57 two-story structures and 151 of one-and-a-half stories. Significantly, all but a few were of wood-framed, balloon-type construction assembled from locally cut timber, usually red cedar or fir, with roofs of cedar shakes.

With two large sawmills, a shipyard, a tannery, a foundry and a brick works, Seattle easily surpassed rival Olympia as the leading industrial centre on the Sound. But more important was the rapid diversification of secondary activity as stores, hotels and wharves were erected to serve the existing industrial base. Cross-sound steamship service linked the waterfront business district with Olympia, Victoria and Port Townsend, as well as service to San Francisco and the East Coast; an overland road was pushed south to Portland and the Willamette settlements; and surveyors explored the Cascade passes for the impending arrival of the Northern Pacific Railroad.

Despite the overall tone of optimism in this heady period of urban expansion, however, at least some of Seattle's businessmen had grave reservations about the permanence and safety of the city they had erected on Elliott Bay. Presumably these reservations were occasioned by a major (but unfortunately nameless) fire, for in the understated opinion of a 1939 pamphlet on the history of the Seattle Fire Department, "A spasmodic appreciation of the dangers surrounding them induced some of the more public spirited men to get together in July, 1870, and form a hook and ladder company." The City Council concurrently passed a resolution
requiring a 40-gallon cask of water to be kept in each house and place of business, under penalty of a ten dollar per day fine for noncompliance. This effort at creating a proper volunteer fire department was less than successful, for the company was unable to afford a wagon to carry the clumsy ladders, buckets and axes: "Owing to the absurdity of carrying ladders on the backs of men and a general lack of interest, the company soon disbanded and the formidable ordinance . . . forgotten." ¹⁸

As would often prove to be the case, this lack of interest in protecting the business district only lasted until the next major fire. This occurred in 1876, when the general store of T. P. Freeman on First Avenue below Yesler Way was destroyed in a blaze that threatened the entire commercial district. As a direct result, on July 6, 1876 the Seattle Engine Company #1 was created, with elected officers and its own "constitution." The engine in the title referred to a used hand-pumped engine acquired from Sacramento, California, while a hose cart and a supply of hose was borrowed from Port Gamble until more could be purchased. ¹⁹

By the fall of 1878, Seattle's volunteer company had raised $3000 for a third-rate Gould steam fire engine. The engine was delivered the following February by steamship, and was paraded through the streets pulled by six horses. The social aspects of Seattle's entry into the vanguard of North American firefighting technology are to be noted as well, for later "the citizens sat down to a bounteous dinner given by the ladies of Seattle," followed by a dance at Yesler's Hall. ²⁰

The test of Seattle's volunteer fire company finally came in July of 1879, when the city suffered its first conflagration. A late evening fire which began in the American House, a hotel at the foot of Yesler Way, burned all night and the following day before it was controlled. The
FIGURE 3: An 1865 view of the Seattle business district. All of the buildings are wood frame boxes with gable roof and, in some cases, false fronts. (University of Washington Library, Photograph Collection.)

FIGURE 4: Two decades later, only the size of the buildings has changed: Commercial Street in the mid-1880's. Note the elaborate facades on the otherwise simple frame buildings. (University of Washington Library, Photograph Collection.)
The total loss was around $100,000, and included the destruction of Yesler's Mill, a grist mill, a chair factory, two sash-and-door factories, two warehouses, a machine shop, a hotel, a seamen's home and five saloons, along with a number of lesser structures. The steam fire engine performed admirably despite minor problems with loose suction fittings, and the older hand engine--skillfully pumped by volunteer sailors from nearby ships--was also invaluable, but both were apparently overwhelmed by the magnitude of the blaze.²¹

The Seattle conflagration of 1879, although historically overshadowed by its 1889 successor, nonetheless had far-reaching effects on the morphology of the central business and industrial district. The most immediate result was that the City Council established fire limits in the commercial core of the city, within which certain building practices and materials were prohibited. Further details of this first attempt of city government to recognize the fire hazard have apparently not survived, but experience with similar legislation elsewhere suggests that all-wood construction was probably banned outright, increased spaces between new buildings specified, and some rudimentary form of zoning commercial and industrial land uses applied. Within two months of the fire, seven new buildings had been erected to replace fire losses, and J. M. Colman, the lessee of the Yesler Mill, was busily rebuilding it.²²

Besides bringing municipal government directly into the fire prevention business, the 1879 fire also led to dramatic improvements in the volunteer fire department. In July of 1882, with most of the burned district completely rebuilt, the City Council provided $3250 in municipal funds to buy an additional Gould steam fire engine. Around this was formed a second volunteer engine company. The construction of a new city
hall and jail in 1883 included a brick engine house to replace the existing wooden sheds, thus giving Seattle its first formal firehouse. 23

The decade of the 1880's was a pivotal one in the growth of Seattle, owing largely to economic improvements engendered by the arrival of the first transcontinental railroads. Although rival Tacoma had been selected as the terminus for the Northern Pacific Railroad, Seattle mills and businesses were able to ship and receive cargo via water links to Tacoma and, after 1886, to Vancouver and the Canadian Pacific line as well. In 1880, Seattle's population was 3,500; by 1886 it had reached 20,000. New industries included several waterfront sawmills and a salmon cannery; other new construction included the city's first hospital and the Frye Opera House, as well as many large houses, waterfront improvements, the planking of streets and sidewalks, and a horsecar line down Front Street. 24

While the newly-organized Seattle Chamber of Commerce (1882) trumpeted news of the city's dramatic economic boom to potential immigrants and investors from the East, there began to appear a dark corollary to unfettered urban growth: the increasingly obvious inability of the city's volunteer fire companies to cope with the urban fire hazard. This point was forcefully driven home on May 13, 1883, when the steamship MISSISSIPPI caught fire while tied up to the waterfront coal bunkers. Damage was confined to the loss of the ship and 300 feet of pier, but a much larger conflagration was only narrowly avoided. On April 11 of the following year, after much debate over the role of public versus private firefighters, the City Council passed an ordinance to create a Seattle Fire Department. From among the delegates dispatched to the meeting by the various fire companies, Gardner Kellogg was appointed Fire Chief. Kellogg had been an elected officer of several of the early volunteer companies and enjoyed
popular support among Seattle firefighters, an advantage that many later political appointees to the office would not share.\textsuperscript{25} Also, the creation of the new department actually only meant that the city government was responsible for equipment purchases and a permanent staff of officers and engineers—the rank and file firemen remained unpaid volunteers.

In spite of municipal government's newfound interest in improving the equipment and management of Seattle's volunteer firemen, major fires continued to plague the city during the later 1880's. Among these were the destruction of, in the spring and summer of 1885, an Oriental lodging house, the Stetson-Post sawmill, the Strauss dry goods store—the city's largest mercantile firm—and the upper story of the Post-Intelligencer newspaper offices. In 1886, the Yesler mill burned again; the following February, the Central School building at 7th and Madison was completely destroyed, followed shortly thereafter by the destruction of a major hotel, the Pacific House.\textsuperscript{26}

The shortcomings of Seattle's attempts to control the urban fire danger can be better appreciated by a close examination of the only extant city annual report for the decade preceding the conflagration of 1889—that of 1886. The 1886 Annual Report began with an upbeat message by Mayor Henry Yesler, in which he noted that the city was in "good shape" financially despite the recent two-year depression (1884-1886), and that most of the city's money was going into improvements in streets and sidewalks. Those improvements included planking existing thoroughfares as well as laying out new ones beyond the business district, and regrading some of the steeper streets. Yesler also mentioned that the fire department was "very efficient" and adequate for the size of the city except for needing a new hook and ladder wagon.\textsuperscript{27} He concluded on a highly optimistic note:
I believe that in the near future more than one trans-
continental railroad will be humbly asking for our trade
and support. When that day arrives it will be a matter
of wonder that any other city upon Puget Sound ever
dreamed of being our rival, far less our superior. Our
position is unexcelled; our advantages are unsurpassed,
and our future superiority is a certainty.\textsuperscript{28}

Also included in the 1886 report was a brief section by Fire Chief
Gardner Kellogg on the status of his department, which took a somewhat
more down-to-earth approach. Kellogg suggested that the increasing number
of three-story buildings in the business district required a new hook and
ladder truck (i.e., wagon) with longer ladders. Also mentioned were the
need for regrading streets east of 3rd Avenue due to their steepness and
the corresponding difficulty of getting fire equipment up the hills, and
the need for a city ordinance to regulate gatherings in theatres, schools,
churches and halls, specifically, to ensure that aisles were kept open and
that adequate exits were available.\textsuperscript{29} It is to be noted that Kellogg's
concerns were probably not motivated exclusively by the danger of fire at
public meetings, however, for this report was written in the aftermath of
the anti-Chinese Riots of February, 1886, in which the firemen performed
"valuable patrol service." Any extension of the Fire Chief's power to
regulate crowds would be an obvious advantage to the city's control of
urban disorder.\textsuperscript{30}

The 1886 report also provides a complete listing of the organization
and equipment of the department. Since neither was improved appreciably
before 1889, a brief review would be helpful. The Seattle Fire Department
was organized into five companies: three engine companies, a hose company
and a hook and ladder company. The core of the department were Engine
Companies #1 and #2, each equipped with a Gould third-class steam fire
ingine and associated equipment. Engine Company #3 operated the older
hand-pumped engine on smaller fires and as a backup to the steam engine companies. The remaining companies assisted the engine companies as necessary. 31

While Kellogg's report does not mention it, the morale of the firefighters during the late 1880's was very low. Meetings were poorly attended, and there was bitter factional strife within the department. 32 Most of this appeared to come from increasing public criticism of the performance of the volunteers--especially following the Central School fire in 1887--and the difficulty of manhandling the heavy equipment through muddy streets, as the only horse teams were used to pull the two steam engines.

Finally, there were serious problems with the urban water supply. Henry Yesler had tapped a spring uphill from his mill in 1853, and the wooden "V"-shaped flume was Seattle's first water system. In the early 1880's, a private firm known as the Spring Hill Company built a reservoir and a series of hollow log pipes with wooden spigots to supply the business district. By 1889, the Spring Hill system was well distributed throughout the business district, but the old wooden mains were small and the hydrants few and often defective. The 120 pounds of static pressure available was capable of providing only three or four streams of water, and Elliott Bay water was inaccessible at low tide in all but a few locations. 33 Such were the conditions when the alarms rang on June 6, 1889 for the Great Seattle Fire.
The Great Fire of 1889

From its 1880 census population of 3533, Seattle had grown to over ten times that figure by 1889. Much of the effect of this explosive growth rate on the city's morphology can be seen in the 1889 view of the City (Figure 5) drawn the month before the Great Fire. A narrow belt of waterfront industries--mostly sawmills, wharves and warehouses--stood adjacent to a densely clustered commercial district of two- to four-storied office, business, and hotel blocks. Beyond the commercial district was a belt of multi-family housing, then a broad swath of single family homes extending north to Lake Union and east to Lake Washington.

The only noteworthy change in construction materials and methods in the business district during the late 1880's was the erection of a number of masonry-shell commercial buildings along Front Sreet (later First Avenue) between Madison and Yesler. Built of local sandstone and brick, the interiors of these structures were constructed entirely of wood: joists, floors, lath and plaster partition walls, window frames and roof trusses, as well as most of the interior furnishings, were built of local softwoods. Figure 6 illustrates the appearance of this district of "fireproof"--as they were usually referred to in contemporary accounts--business blocks. Not only did these newer buildings approach or exceed the height limitations of the fire department's steam pumpers, but their flamboyant Victorian architectural styles provided a host of inaccessible nooks and crannies within which a fire could gain rapid headway. Fashion, as usual, took precedence over safety and common sense.

Both the account of the conflagration in Part I of this study, and the accompanying diagram (Map 4) convey the almost total destruction of
FIGURE 5: "Bird's Eye View" of Seattle in 1889, showing the morphological features of the prefire city. All of the clustered business blocks at center foreground were victims of the conflagration. (Center for Pacific Northwest Studies.)
FIGURE 6: A last look up Yesler Way the day before the fire. Among the "fireproof" buildings recently erected here are the Occidental Hotel (centre) and the Yesler-Leary Building (left). (University of Washington Library, Photograph Collection.)

FIGURE 7: The Great Fire of June 6, 1889. Looking south on Front Street just minutes after the Pontius Building erupted in flames. The Opera House dome is visible in the centre. (Seattle Public Library.)
MAP 4: THE GREAT SEATTLE FIRE, June 6, 1889. The shaded area depicts the almost total destruction of the commercial core of the city. (University of Washington Library, Northwest Collection.)
SEATTLE,
THE DAY OF THE GREAT FIRE,
2:45 PM. JUNE 6, 1889

DRAWN BY W. H. BRINGhurst

DIRECTION OF WIND: N.W.
10 TO 15 M.P.H. PER W.C.

ELLIOTT BAY.

9:30 P.M.
the urban core, yet the postfire mood in the city was one of optimism. Morgan's account of the postfire attitude includes mention that "the phrases repeated most often were 'a pull all together' and 'to rise like a phoenix'." This attitude was in fact carried to great extremes: $576 that had been previously raised for the homeless victims of the Johnstown Flood was not retained for Seattle's use, but sent on to Pennsylvania! Most merchants were back in business the following day in canvas tents—even the prostitutes in the mill district south of Yesler Way—and most pronounced plans to rebuild on their former sites rather than move elsewhere.

Murray Morgan concluded his account of the fire by noting that, while 5000 men had lost their jobs because of the fire, "... there was work for everyone rebuilding the town. A brick town. No more fires." This resulted in a surge of population growth:

It takes many men to build a masonry town. Seattle gained more than it lost by the fire. When the fire started Seattle's population was estimated at 31,000... in 1890, less than a year after the fire, they found... 37,000 inhabitants.

The Great Fire of 1889 was to have far-reaching effects on Seattle's urban morphology and future growth, as well as that of other cities in the region. Morgan's conclusion that the fire was a boon to Seattle is essentially true: the flames destroyed the jerry-built wood-frame business district that had grown, unchecked and unplanned, since the arrival of the Denny party in 1852. The destruction of the city, in conjunction with the recent arrival of railroads and railroad-based investment capital from the East, ensured that the new Seattle that arose from the ashes would be as modern and fire-resistant as money and contemporary building technology
FIGURE 8: The aftermath of the Great Fire of 1889. This is the same view as Figure 6, with the gutted shell of the Occidental Hotel at right centre. (University of Washington Library, Photograph Collection.)
could make it. However, while there is more than just a grain of truth to this theory, the actual reconstruction of Seattle (and its fire department) was much more complex.

The most immediate and obvious changes following the fire were those involving the volunteer fire department. In his first post-fire annual report, Mayor Robert Moran attempted to divert public attention from the city's dangerous pre-fire conditions by elaborating upon the improvements begun before the fire. These included the direct management of the department by the City Council, the acquisition of three teams of horses, the hiring of new drivers for the fire engines and hose carts, the appropriation of "much money" for new fire hydrants and the remodelling of the engine houses. Moran suggested that "... such an advance had been made in the efficiency of the Fire Department as we fondly believed would meet any emergency which should arise." But the fire of June 6, 1889 was of such "stupendous character" that any improvements based on prior experience would have been in vain. Although he does not explicitly mention it, Moran was responding to widespread criticism of the performance of the firemen during the conflagration, and the obvious inadequacies of equipment and training.

On October 26, 1889, the city of Seattle created a fully-paid municipal fire department--the second such department on the West Coast--in response to criticism of the volunteers. As all but three firefighters promptly resigned, the department had to be rebuilt from scratch. Five new engine houses were built, at a cost of almost $50,000, to replace the two original ones lost in the fire. Other purchases included two new steam fire engines, a chemical engine, a complete Gamewell fire alarm system of call boxes and lines for the business district, and the ordering
of a harbour fire boat for $40,000.\textsuperscript{39} There were still some serious shortcomings, however. A shortage of horse teams for several years required the return of the team to the firehouse to pick up another engine for multi-alarm fires, and it was not until 1901 that the city could afford to locate an enginehouse in the central business and manufacturing district owing to inflated property values during the boom years of the 1890's.\textsuperscript{40}

In terms of the physical appearance of the "new" Seattle, the changes brought about by the fire were even more pronounced, and one of the most obvious was the replatting of the entire business district by the City Surveyor's office. The near-permanence of an existing street pattern over centuries of urban growth is a fundamental tenet of historical urban geography, as most European and eastern North American cities illustrate. Seattle's post-fire replat was a rare occurrence even in the West, where the aftermath of conflagration often suggested, but seldom accomplished, such a feat of urban rejuvenation. The end result was not, of course, a total redesign of the existing street pattern but, rather, the widening of the numbered avenues, improvements of intersections and, perhaps most important, a regrading of streets in the notoriously hilly business district. (The latter effectively covered up pre-fire street levels and gave Seattle an "underground city" for later generations of tourists.)

The replat also involved the waterfront district and the newly arrived Great Northern and Union Pacific railroads, bringing a measure of order to the previously chaotic intermingling of street, rail and wharf facilities. Probably the major reason for these improvements was that, because most of the streets and sidewalks in the business district had been either planked or replanked in the year preceding the fire, the actual streets had been destroyed along with the buildings, not to mention all of the
pier inclines and elevated approaches to the waterfront. On June 7, 1889, the day after the fire, Mayor Moran met with 600 Seattle businessmen to gather opinions on the question of building codes for new construction in the city. It was here that the widening and straightening of the street grid was first proposed and endorsed, but the majority of recommendations were directed at completely forbidding wood frame construction in the downtown core. Within a matter of days the City Council had passed ordinances to this effect, with a special dispensation to allow businesses to operate in tents until their new masonry quarters were completed. Also, a city Building Inspector was appointed to ensure that the reconstruction proceeded according to the new laws.

As previously suggested, Seattle's urban historians have used these building codes of 1889-1890 to mark the beginning of a modern and almost "fireproof" central business district. But despite the destruction of a number of identical masonry buildings in the 1889 conflagration, post-fire construction tended to follow the same building technology, in keeping with the late nineteenth century misconception that structures with masonry exteriors were inherently resistant to fire. As a result, the spectre of urban fire would continue to threaten Seattle for several more decades, in spite of the post-1889 building ordinances.

The final major area of post-conflagration improvements was the modernization of the Seattle public water supply. In a July 1889 general election, a one million dollar bond issue for a new waterworks was approved, and the city was authorized to take over the two existing private water companies. A nationally-known hydraulic engineer recommended tapping the Cedar River watershed, but the economic fluctuations of the 1890's, in
FIGURE 9: Pioneer Square and Yesler Way in the early 1890's. The new Occidental Hotel is at centre, Elmer Fisher's Pioneer Building is to the left. (University of Washington Library, Photograph Collection.)
FIGURE 10: An 1891 perspective view of Seattle showing the dense concentration of masonry blocks that were erected after the 1889 fire. Note the spreading "streetcar suburbs" to the east and north. (Center for Pacific Northwest Studies.)
conjunction with short memories about the conflagration, delayed the completion of this ambitious project until 1901. In the meantime, a system of cisterns fillable from fire hydrants was begun as a stopgap measure.45

The Great Seattle Fire also played a central role in the history of Washington Territory, for congressional limitations on territorial indebtedness threatened the city's recovery: "The fire of June 6th produced conditions which, in the event of our remaining a territory, would have been well nigh insurmountable," said Robert Moran, and "... our only relief is to be found in statehood, from the vassalage of Congressional and Territorial laws."46 While a statehood movement was underway even before the fire, the movement gained impetus not only from Seattle voters, but from residents of Ellensburg, Spokane, Vancouver and other smaller Washington Territory towns, all of which had major fire losses during the summer of 1889. These efforts were crowned with success on November 11, 1889, when President Benjamin Harrison signed into law a bill granting statehood to Washington.

**Fire in the 1890's**

The decade between the Great Seattle Fire and the beginning of this present century was a crucial one in the morphological evolution of the city. Not only was the central business district rebuilt in brick and stone, but the city weathered its first major depression, the "Panic of 1893," and its first modern industrial "boom," the Yukon gold rush of 1897-1898.

From the standpoint of the urban fire hazard, the 1890's were a misunderstood period in the city's morphogenesis, for as previously noted,
most of Seattle's urban historians dismiss the question of fire after describing the reconstruction in brick and stone. However, a close examination of building records for this postfire period reveals a different story. Upon reflection, it is presumptuous to think that a city surrounded by the greatest forests on the continent, populated by people with two centuries of woodworking experience, and whose major industry was the cutting, processing and shipment of timber, would turn overnight to unfamiliar, expensive, and often unavailable building materials, no matter how great a tragedy might have suggested such a change.

That Seattle continued to build in wood after 1889 is borne out in the 1890 report of the newly-appointed Building Inspector. From his July 18, 1889 appointment through May 31, 1890, 2,525 building permits were issued; of these 2,172 were for wood frame buildings with a cost of $3,291,915. Most of these were new residences for the influx of new arrivals, rather than replacements. In the business district, 163 new buildings of brick and stone went up at a cost of $5,510,266; only eleven of these were outside the burned area. The concentration of these masonry buildings in the business district is apparent in Figure 10, with similarly distinct wharf and industrial areas to the west and south, and dispersed residential areas to the east and north.

While the intent of the new fire law requiring masonry construction in the business district was to eliminate the risk of another conflagration, this was not at all successful. In the Municipal Report for 1891, the newly-appointed Board of Fire Commissioners suggested that these buildings erected after the fire were done so hastily that they were neither fireproof nor slow-burning, were filled with combustibles, had open elevator shafts and stairwells of wood, and sixteen-foot wide alleys
at the rear with no fire shutters for windows: "... such is the condition of most of the buildings in the business portion of our city." Realizing that the purchase of additional firefighting equipment was economically impractical, the Fire Commissioners recommended instead that the City Council pass and rigidly enforce legislation to "... reduce the risk of fires rapidly spreading through ... adjoining buildings." 48

The Fire Commissioners also protested cutbacks in staffing the city's fire department which, by 1891, had grown to include four engine companies, two truck (i.e., hook and ladder wagon) companies, three chemical companies and the fireboat. They pointed out that such cutbacks would ultimately cost the Seattle taxpayer more rather than less, because fire losses are public losses, whereas fire insurance companies—not being "philanthropic institutions"—were "... quick to see to their own interests, and their losses were ultimately paid by the policyholders in any case." 49

The 1891 report went on to list some serious problems found by the Seattle Fire Department. Some of the more prominent were dealt with as suggested additions to the building and fire codes, including:

1) firewalls: should be thicker, and run through and above rooftop lines.

2) exits: most fire casualties were in three to four story tenements with narrow stairways and a single exit.

3) electric insulation: Seattle was far ahead of other U.S. cities in adopting electric power, but laws for its safe use lagged. This created special dangers for firefighters using streams of water and wet ladders.

4) oils and explosives: permanent storage in the fire limits was already forbidden by ordinance, but many merchants construed this to mean that "temporary" storage (until stock was sold) was legal. Seattle's use as a trans-shipment point for explosives bound for interior mining areas, and later Alaska and Canada, made this a special danger.
5) **buildings on pilings:** storage of combustibles in wharf areas was a major problem, and also access to underside of piers—a lesson from 1889. Recommended use of "protective bulkheads" to prevent rapid spread of fire.

6) **open elevator shafts:** almost every building in the business district had open elevator shafts and/or stairwells, which caused a natural "chimney effect" during a fire.

7) **fire marshall:** of all known causes of fire in 1890, the leading one was arson. The creation of a fire marshall's office to investigate all arson fires was recommended. 50

The commissioners concluded their report by noting that, while the rapid growth of post-fire Seattle was indeed remarkable, the rush to get "under cover" before the fall of 1889 had led to "... a city of brick walls enclosing hundreds of thousands of feet of inflammable pitchy lumber. Within these walls there are no division walls [firewalls], no bridging [slow-burning, or mill-type joists], nor filling [insulation] to prevent the spread of fire throughout the building in the quickest time." They called on the City Council not to delay in making these improvements because the city was ripe for an even greater disaster than the 1889 fire, and "... the safety of the city and the prosperity of the people depended upon quick action." 51

These ambitious suggestions were aired at the beginning of the great depression later called "The Panic of 1893," however, and few of them were implemented until after 1900, under pressure from large fire insurance corporations. Although the Board of Fire Commissioners remained as an advisory body to city government, their reports no longer appeared in the annual Municipal Report after 1893. From 1900 onward, the preparation of such reports was carried out for Seattle and other Washington cities by a special committee of the National Board of Fire Underwriters, an organization whose origins and functions will be dealt with in a later chapter.
The experience of the Seattle business district with fire during the 1890's certainly suggests that the post-fire improvements of 1889-1890 were less than successful, although there was never again a conflagration of the scale of the Great Fire. The following brief review of major fires during this period serves to illustrate a number of shortcomings in the city's approach to fire prevention and control.

Many merchants were not yet into their new buildings when, on February 8, 1890, the new Gamewell alarm system tapped out its first summons. A tent fire at Columbia and Second Avenue had spread to other tents and wooden construction scaffolding, causing a $40,000 loss. Three other tent fires during the same year also caused heavy losses. December of 1890 saw the commissioning of the Fire Department's new fireboat, SNOQUALMIE, the first vessel of its type on the Pacific Coast. Despite her capability of delivering 7000 gallons of water per minute to a waterfront fire, SNOQUALMIE was unable to save the Mechanics Mill, located on the tide-flats in water too shallow to navigate at low tide. This loss of $75,000 was the city's largest single fire until July 27, 1892, when the Schwabacher Bros. wholesale chandlery and hardware store at Jackson Street and First Avenue South went up in flames. The fireboat performed yeoman service from the harbour side, but the $375,000 loss vindicated the opinion of those with reservations about post-fire masonry construction. Still another myth was laid to rest in May of 1893, when a corrugated iron building--"once believed to be fireproof material"--was destroyed by fire. A multistory warehouse crammed with combustibles, this blaze was difficult to control because sheets of corrugated iron frequently came loose and "sailed in aimless fashion onto the firemen below."
Numerous other "fireproof" buildings were destroyed by fire in subsequent years. One of the worst in terms of loss of life occurred in October, 1894, when a two-story corrugated iron hotel at Western and Columbia was destroyed. Sixteen people died, either in their rooms or in the four-foot-wide paper and muslin-covered hallways. And this, according to contemporary standards, was "fireproof" construction!

Another "fireproof" brick and stone business block went up in July 1898, when the Seattle Soap Company at Western and University was destroyed in what almost became another major waterfront conflagration. This followed the loss of the electric railway power house and car barns at Fifth and Pine (June 1895, $100,000); the Kerry Mill (November 1897); Sacred Heart Catholic Church and School (March 1898, $25,000); the Frye-Bruher Packing Co. (September 1898, $165,000); and a number of other major buildings, all of which were built after 1889 of "fireproof" construction. Table 1 illustrates the magnitude of the problem.

### TABLE 1

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of Fires</th>
<th>Fire Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 1889/May 1890</td>
<td>73</td>
<td>$85,315.00</td>
</tr>
<tr>
<td>June 1890/Sept. 1890</td>
<td>69</td>
<td>163,665.00</td>
</tr>
<tr>
<td>Oct. 1890/Sept. 1891</td>
<td>140</td>
<td>126,507.00</td>
</tr>
<tr>
<td>Oct. 1891/Dec. 1891</td>
<td>36</td>
<td>70,858.00</td>
</tr>
<tr>
<td>1892</td>
<td>170</td>
<td>411,152.00</td>
</tr>
<tr>
<td>1893</td>
<td>197</td>
<td>84,011.00</td>
</tr>
<tr>
<td>1894</td>
<td>158</td>
<td>111,694.00</td>
</tr>
<tr>
<td>1895</td>
<td>208</td>
<td>219,142.00</td>
</tr>
<tr>
<td>1896</td>
<td>200</td>
<td>60,465.00</td>
</tr>
<tr>
<td>1897</td>
<td>169</td>
<td>65,073.00</td>
</tr>
<tr>
<td>1898</td>
<td>258</td>
<td>40,475.00</td>
</tr>
<tr>
<td>1899</td>
<td>227</td>
<td>193,337.00</td>
</tr>
<tr>
<td>1900</td>
<td>292</td>
<td>82,377.00</td>
</tr>
</tbody>
</table>

**SOURCE:** Northwestern Mutual Fire Association, "50 Years of Fire Fighting," 19-20.
For the most part, the preceding discussion of the impact of fire on Seattle's morphology has concentrated on commercial and industrial fires. This is primarily due to a lack of statistical data on residential fire, and the fact that most fire-related legislation before 1900 was oriented toward preservation of the city's commercial core. Yet since by far the greatest number of fires recorded in the above table were residential fires, a short review of the residential fire hazard is appropriate.

From a morphological standpoint, Seattle's residential areas closely resembled those of other Pacific Coast cities. In a belt surrounding the business district a residential zone of "better residences" had emerged by 1900. These belonged to the city's well-to-do social class—merchants, doctors, lawyers and the like—and were often designed by professional architects in the prevailing architectural fashions of the day. For Seattle and other Puget Sound cities, the most popular style in the 1890's was usually the Queen Anne Revival (Figure 11), followed by variations on the Second Empire and Italianate styles. Unlike their Eastern counterparts which featured mixtures of stone and brick with hardwood, these examples were most often built entirely of local softwood and roofed with cedar shakes. The balloon-type framing used in these houses, in conjunction with multiple fireplaces, oil lamps, and inaccessible nooks and crannies in the attic area, virtually assured their complete destruction in the case of all but the most minor fire.

Beyond this inner belt of expensive housing lay "streetcar suburbs" of predominately working-class houses, many of which by 1891 had been incorporated into the city limits (see Map ). These simple one-family homes were also prone to fire damage or destruction, but even though they
FIGURE 11: Mayor Henry Yesler's "Queen Anne" style mansion. Constructed entirely of native softwoods, such houses were prone to total destruction by fire in a short period. (University of Washington Library, Photograph Collection.)
tended to be built on very small lots, evidence suggests that seldom was more than one house lost in a fire. The distance of a house from the nearest fire station and the condition of intervening streets was obviously a critical factor and, for the most part, fire department efforts were directed at saving adjacent houses rather than directly attacking a fully-involved wood-frame house.

A final question regarding residential fires is, "what was the most likely cause of fire?" Fortunately, the Fire Department reports for both 1892 and 1893 contain these statistics. For 1893 the leading causes of Seattle house fires are listed in Table 2.

TABLE 2

<table>
<thead>
<tr>
<th>Cause of Fire</th>
<th>Number of Fires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>39</td>
</tr>
<tr>
<td>Lamp explosion/overturn</td>
<td>20</td>
</tr>
<tr>
<td>Defective flue</td>
<td>13</td>
</tr>
<tr>
<td>Sparks</td>
<td>12</td>
</tr>
<tr>
<td>Arson</td>
<td>11</td>
</tr>
<tr>
<td>Brush fire</td>
<td>9</td>
</tr>
<tr>
<td>Chimney</td>
<td>7</td>
</tr>
<tr>
<td>Stove</td>
<td>5</td>
</tr>
<tr>
<td>Hot ashes</td>
<td>5</td>
</tr>
<tr>
<td>Electrical</td>
<td>4</td>
</tr>
</tbody>
</table>


These causes appear to be typical for the period. Of special interest is the fact that the largest known category of fires were caused by oil lamps, which in later years would speed up public acceptance of electric lighting. With pressure from both municipal government and insurance companies, in addition to the simple matter of convenience, Seattle by 1900 had developed an extensive electrical power system.
Fire and the Growth of Seattle

By 1900, it was apparent that the various measures introduced to prevent or control urban fire in the years following the 1889 conflagration had been less than successful. It is true that there were some areas of notable improvement: the widening and regrading of the business district streets, the purchase of more steam fire engines, the creation of a professional fire department and its dispersion to strategically placed neighbourhood fire houses, the installation of a telegraph fire alarm system, the new fireboat and water system are among the major ones.

Despite these improvements, it was widely believed that the one great advance that would make Seattle safe from fire were the building codes that required brick and stone construction in the business district, the "fireproof" method of construction. The previously cited Fire Commissioner's report of 1891 suggested that these buildings were far less safe from fire than was commonly expected. A careful examination of other records from both the pre-fire and post-fire years--especially the Sanborn fire insurance plans of the city--supports this contention. Fortunately for the urban geographer, the city had just been surveyed in 1888, so there are detailed building plans available for both before and after the conflagration.57

Probably the most overlooked facet of commercial building construction in the pre-fire core was that masonry-shell buildings were beginning to appear as early as 1885, during the early phase of what would evolve into the railroad-inspired building boom of the late 1880's. Two examples of this type of construction are worthy of further examination,
the 1885 Frye Opera House, (Figure 12), and the triangular Occidental Hotel of 1884 (Figure 13).

The Frye Opera House was erected in 1884-1885 by George Frye, who retained architect John Nester to design the largest theatre north of San Francisco, using a Second Empire design with a prominent mansard roof. The theatre had a seating capacity of 1400, with elaborate stage set facilities and "five large exits" in case of fire or panic. As detailed in the insurance plan (Figure 14), the building was constructed of brick with stone trim. Provisions for fire included five internal fire hydrants, each with thirty feet of hose, in the stage area.58

The Occidental Hotel was Seattle's finest hostelry, and had been erected to replace an earlier wood frame hotel on the same site. The brick and stone four-story structure occupied the triangular block bounded by Yesler Way, Second Avenue and James Street. Like the Opera House, it was of brick faced with stone (except for a wood frame dining hall and kitchen at the northeast corner) and featured a similar mansard roof (Figure 15).59

Both of these buildings were destroyed during the Great Fire of 1889. Figure 16 shows the hardware store at the southwest corner of Front and Madison where the fire began; the Opera House succumbed to the flames as the wind from the north pushed the fire through the surrounding wood-frame buildings. When the fire involved the wood-frame blocks north of Yesler, the Occidental was doomed in a similar fashion and the fire rushed south leaving only a gutted shell.60

When the business district was rebuilt after the fire, supposedly in "fireproof" brick and stone, the fate of these two earlier examples of this type of construction in a conflagration was ignored. In the 1893
FIGURE 12: The 1885 Frye Opera House on Front Street, prefire Seattle's finest building. (University of Washington Library, Photograph Collection.)

FIGURE 13: The 1884 Occidental Hotel on Yesler Way. (University of Washington Library, Photograph Collection.)
FIGURE 14: Insurance Plan of Frye Opera House, from 1889 Sanborn Fire Insurance Folio. Red tint denotes joisted brick construction, yellow is wood frame, green is "special risks," (i.e., highly flammable). (University of Washington Library, Northwest Collection.)

FIGURE 15: Insurance Plan of Occidental Hotel, from 1888 Sanborn Fire Insurance Folio. Building was of joisted brick construction (pink) except for frame dining room and store-room (yellow). (University of Washington Library, Northwest Collection.)
FIGURE 16: The Pontius Building, origin of the Great Fire of 1889, stands at the southwest corner of Front and Marion. Green tint denotes a "special" fire risk, as was the case with the liquor stored in the saloon next door. (University of Washington Library, Northwest Collection.

FIGURE 17: The new Occidental Hotel of 1890. Note structural similarities to its predecessor (Figure 12). (University of Washington Library, Northwest Collection.)
edition of the Sanborn fire insurance plans, for instance, the new Occidental Hotel (Figure 17) was virtually identical to its predecessor from a building technology standpoint: a wood frame building in a masonry shell. However, some improvements are apparent: note the "artesian well with steam pump" adjacent to the boiler room, and the fire alarm box at the James/Yesler corner of the building. In a similar fashion, the Pioneer Building of Elmer Fisher (Figure 18), which was probably the best known and most definitive example of post-fire Seattle commercial architecture, is of similar construction and shares the city block with two identical, but smaller, structures.

The overall effect of the widening of the numbered avenues following the fire is shown in Figure 19, as well as the appearance of the tightly-clustered new brick commercial buildings. The fact that the all-brick rule was eased after the fire can also be seen in Figure 19, which clearly shows the sort of intermixture of brick and frame buildings, hotels, apartments and churches that had proven fatal in 1889.

Finally, the sheer abundance of lumber and the economic impracticality of building residential structures of masonry can be seen in Figure 20, which depicts the multi-family residential zone several blocks east of Pioneer Square in 1893. Here, not only was every single building of wood-frame construction, but they were literally jammed together on the small urban lots.

In a similar fashion, most of the waterfront industrial area was permitted to be rebuilt in wood, albeit of much heavier "slow-burning" or mill-type construction. Figure 21 depicts five of the major docks rebuilt across the multiple railroad tracks of the new Great Northern freight
FIGURE 18: Elmer Fisher's Pioneer Building of 1890, as a typical post-fire block. Note the narrow alleys and adjacent window exposures. Blue trim on Bailey Block is a stone facade. (University of Washington Library, Northwest Collection.)

FIGURE 19: The widening of the north-south avenues and intermingled frame and brick buildings even after the fire are apparent in this 1893 insurance plan. (University of Washington Library, Northwest Collection.)
FIGURE 20: Typical wood-frame residential block east of the CVD in 1893. (University of Washington Library, Northwest Collection.)

FIGURE 21: Waterfront industrial area at foot of Yesler Way, 1893. (University of Washington Library, Northwest Collection.)
yards. Of these piers, warehouses and industries, only the Bogardus Company Flour Mill was of brick construction. The rest evidently counted on rapid deployment of the fireboat and steam fire engines to control a fire in this area.

There are several significant points that can be drawn from this comparison of pre-fire and post-fire Seattle, but one stands alone in its importance to the effect of fire on the city's morphological development: the level of building technology for commercial, industrial or residential uses was virtually unaffected by Seattle's 1889 fire experience. The buildings in the commercial district were of the same type of construction as pre-fire masonry buildings, the only difference being that there were now more of them, and they were slightly better separated by the wider streets. As a result, the new "fireproof" Seattle described by urban historians as having been built on the ashes of the pioneer city was just as susceptible to fire as its predecessor. Only the kindness of fortune (and a slightly more efficient fire department and water system) prevented the holocaust feared by the Fire Commissioners in 1891. The rise of a new and more fire-conscious business district to the north of the post-1889 commercial area would be the product of a new century and more complex economic forces.
CHAPTER 4

NOTES

1. So many settlers took donation claims on potential urban sites that the Donation Land Law was amended in 1854 to exclude sites "suitable for trade and commerce," but by this point the future urban network of the region was already in place. See Dorothy O. Johansen, Empire of the Columbia, 2nd ed. (New York: Harper and Row, 1967), 81.


3. Ibid., 81-82, 130.


7. Ibid., 289.

8. Ibid., 168.

9. Walker, American Shelter, 142-143.


13. Ibid., 107-108.


16. Morgan, Skid Road, 68.

18. NMFA, "50 Years of Fighting Fires," 4.
19. Ibid., 5.
20. Ibid., 5. Early steam fire engines were "rated" according to their pumping capacity on a scale of one to five. Parameters varied, but generally speaking, a third-rate engine was one of average capacity. See Morris, *Fires and Firefighters*, 165-178.
21. NMFA, "50 Years of Fighting Fires," 5.
23. NMFA, "50 Years of Fighting Fires," 5.
25. NMFA, "50 Years of Fighting Fires," 5-6.
26. Ibid., 7-8.
28. Ibid., 13.
29. Ibid., 39.
30. NMFA, "50 Years of Fighting Fires," 7.
32. NMFA, "50 Years of Fighting Fires," 9.
35. Ibid., 114.
36. Ibid., 115.
38. NMFA, "50 Years of Fire Fighting," 12.
40. NMFA, "50 Years of Fire Fighting," 13.

42. Warren, Seattle, 90.


49. Ibid., 188.

50. Ibid., 192-193.

51. Ibid., 195.

52. NMFA, "50 Years of Fire Fighting," 12-15.

53. Ibid., 17-18.


60. Ibid., #15; Morgan, Skid Road, 109.
CHAPTER 5

PORT TOWNSEND

The origins of Port Townsend, like those of most other coastal cities on Puget Sound, lay in the insatiable demand of gold rush San Francisco for timber and agricultural products. Prior to 1846, uncertainty over the eventual boundary location with Canada and the remoteness of the area had inhibited American expansion into the Puget Sound region. But with the resolution of the border question, the generous land claims available--320 acres for a single man, 640 acres for a married couple and, after 1849, the potential market represented by California for products of the region--caused Americans to flood the North Pacific coast frontier.¹

On February 21, 1852, four families arrived by pilot boat from Portland with their personal possessions and enough merchandise to start a store. Their initial intent was to establish a trading operation between themselves, the local Clallam and Chimacum Indian tribes, and passing sailing ships.² The townsite was laid out on the low, sandy beach below the high bluffs southwest of Point Hudson (Map 5). Although an ideal location for a seaport settlement, the beach site suffered from a lack of room for expansion which was ultimately resolved by building the business district on the water and the residential area on the bluff above.

The establishment of the Puget Sound Customs District at Olympia in February, 1851 was another direct outgrowth of the political separation of the Oregon country into separate British and American possessions, Olympia being the only American settlement on the Sound at the time. In 1854, the Customs office moved to Port Townsend in order to be closer to the arrival point of vessels entering Puget Sound. This move proved to
MAP 5: SITE OF PORT TOWNSEND SETTLEMENT, 1851
(detail from U.S. Exploring Expedition, "Harbours on Admiralty Inlet, Oregon Territory, 1841," (Centre for Pacific Northwest Studies).
a tremendous economic boost for Port Townsend, as ships were required to stop and clear customs. This made the settlement a distribution point for ship's cargoes, a resupply centre, and a point where crews were paid off. The customs headquarters soon became the port's major industry, stabilizing the economic base and bringing in several million dollars per year in both direct and indirect income.  

Port Townsend "boomed" briefly during the Fraser River gold rush of 1858-1859, but the subsequent Civil War years brought misfortune to the settlement. Supplies arrived sporadically, prices became inflated and--the cruelest blow--in June 1862, President Lincoln's new Collector of Customs moved the customs headquarters to Port Angeles. After the end of the war, the customs office was returned to Port Townsend, albeit not without a fierce political struggle that historians Peter Simpson and James Hermanson termed "a civil war all on its own!"  

During the early 1870's, rumours begin to sweep the Puget Sound settlements concerning the location of the terminus for the Northern Pacific Railroad. The leading contenders were thought to be both Seattle and Port Townsend. While both were evenly matched in population, with about 1000 residents each, the prize went to Tacoma in 1873, largely because of the availability of cheap land and virtually no population.  

This marked the end of Port Townsend's dream of becoming, in the words of local businessmen, the "Key City" at the gateway to the Orient, but the actual realization of the impact that the shift from water to rail transportation networks would have on the settlement would not become apparent for another two decades.  

Port Townsend's history for the period 1875-1885 is virtually devoid of any major events but, rather, was a period of consolidation and
development. Since its founding, the town had been an exporter of raw materials—lumber, fish and agricultural products—and an importer of finished goods, with manufacturing limited to a sandstone quarry. The most predominate commercial activities were saloons, followed by hardware and chandlery firms. Port Townsend did not have its own sawmill until the mid-1880's because of the proximity of major mills at Port Ludlow and Port Discovery. Each was represented in Port Townsend by large waterfront lumberyards, however.  

The arrival of the first transcontinental railroad on Puget Sound, the Northern Pacific line to Tacoma in 1883, triggered a real estate and building boom in towns all around the region. Not only in Port Townsend, but in Seattle, Olympia and the twin cities of Fairhaven and Whatcom on Bellingham Bay, new commercial and public buildings were added to the business district to attract investors, new residents, industries and, especially, railroad connections to the main line.  

Port Townsend had every reason to believe it would become a great commercial centre, based on natural resources which included iron, coal, timber, sandstone, fish and good agricultural land, and industries such as the iron foundry at nearby Irondale, sawmills, wood products factories and even a resort hotel for tourists and sportsmen. Of all the real estate transactions that occurred in Jefferson County between 1851 and 1891, the three years between 1889 and 1891 generated sixty-five percent of the total volume. But by 1890, the writing was on the wall as far as Port Townsend's future was concerned: the U.S. census of that year reported a total population of 4,565, as opposed to Seattle and Tacoma with more than 35,000 each. The boom collapsed completely in 1891, following the demise of the Oregon Improvement Company, the firm which
was to build the railroad from Port Townsend to the Northern Pacific main line near Olympia.\textsuperscript{10}

The onset of the Panic of 1893 eliminated Port Townsend completely from any hopes of recovery, and the remainder of the 1890's was spent in a continuous economic decline. Not even the discovery of gold in the Klondike in 1897 was enough to reverse the slump, although the Board of Trade made a determined effort to attract miners to use the town as an outfitting point because it was "10 to 20 percent cheaper than any other place on the Pacific Coast," and, as the last port before Alaska, "our freight is put on top of all other, and is first to be unloaded."\textsuperscript{11} Although some miners did utilize Port Townsend, the lion's share of the business went to Seattle, Portland and San Francisco. Until the arrival of a major forest products mill in the mid-1920's, Port Townsend languished in the shadows of her more successful sister cities, supported for the most part by the federal payrolls of the Customs Bureau and the nearby Army installation at Fort Worden which was, ironically enough, built in 1898 to protect the approaches to the leading ports of the Sound: Seattle and Tacoma.

**Morphological Development**

Port Townsend shared with the other cities of the Pacific Coast frontier the first two phases of urban morphogenesis: the initial frontier town cluster of wood-frame stores and houses, followed by the rebuilding of the main business district in brick and stone. Unlike Seattle, however, the transition between these two phases of urban development was not strongly affected by fire, although Port Townsend's potential for
a major urban conflagration during the early years of settlement was at least equal to that of any other city.

From the beginning, Port Townsend's most distinguishing morphological feature was the sharp topographic division of the business district and the residential areas. The main commercial thoroughfare, Water Street, was little more than a low sandspit below the Point Hudson bluff (Figure 22), and during the 1850's and 1860's evolved into a tightly-packed cluster of wooden balloon-frame buildings of one and two stories divided by an unpaved street (Figure 23). It was perhaps a combination of the lack of suitable residential building sites on the beach and the rough-and-tumble nature of a seaport town that caused most of the inhabitants to build their homes on the bluff. This move was led by the wealthier members of the community—ships' captains, store owners, and customs and military officers; others soon followed until, by the early 1880's, virtually all of the single-family residences in town were on the bluff.12

Port Townsend's balloon-frame business district began a significantly earlier transition to masonry construction than Seattle or other towns of the region. Not only was the presence of a sandstone quarry a contributing factor, but many of the sailing ships calling for cargo would leave ballast of brick and stone from their home ports in the East. The town's first "commodious fireproof store," for instance, was built in 1874 with a two-story ashlar-cut sandstone facade and back and side walls of stone rubble ballast.13 As was the case elsewhere in the region, however, the "fireproof" simply denoted a masonry shell of four walls enclosing a soft-wood interior and topped with a tarred wooden roof.

The real surge in rebuilding Port Townsend's business district in masonry did not begin until the early 1880's and the railroad boom.
FIGURE 22: A view of Water Street from the bluff, 1868. These streets were later raised with fill from the bluff to prevent flooding at high tide. (Jefferson County Historical Society.)

FIGURE 23: Port Townsend's earliest commercial buildings were simply gabled wood-frame boxes with the ubiquitous frontier false front. (Jefferson County Historical Society.)
Beginning with the 1881 Bartlett Building, a series of sandstone and brick commercial blocks went up along Water Street. Some, such as the 1885 C. F. Clapp Building, even had cast-iron facades in the latest Eastern fashion. What was to evolve into the relatively extensive use of iron facades on Port Townsend's buildings was a direct result of having, in nearby Irondale, the only iron smelter in the state until the 1890's. 

By 1887, Port Townsend's building boom was in full swing. Although the town retained its maritime focus, many new businesses and industries were created. During this period, the transformation of the Water Street business district was completed, as the wood-framed, false-front structures of the original settlement were replaced with multi-story business blocks of brick and stone. But while the modernized business district was every bit as impressive as those of Seattle or Tacoma, there remained the stigma of a rowdy, maritime seaport on Water Street. Consequently, a smaller and more conservative business district arose on the bluff to serve the surrounding residential areas.

The peak years from 1889 to 1891 saw a host of other improvements as well. Access to the bluff district was improved by sluicing away parts of the hill to allow better street grades. Much of the fill went into the Water Street area to raise street levels as much as five feet to prevent the flooding of lower stories during abnormally high tides. Also, sea walls were erected and wharves extended to allow construction of a new street--called Front Street--on pilings over the water.

Much of this construction was hastily done, unfortunately. In order to match the private blocks going up along Water Street, the municipal government in 1891 built a city hall of brick and stone to "... be worthy of the developing town." The construction was so poorly done
that the third story, including a large corner tower, had to be removed several years later, leaving the structure with a somewhat truncated appearance. More foresight was shown in the erection of the Jefferson County Courthouse in 1890, which used four million bricks (Figures 31, 32). The eastern bricks have held up much better than their local counterparts.

The collapse of the railroad-inspired boom in 1891 made Port Townsend into a virtual ghost town by 1900. For the purpose of understanding late nineteenth century urban morphology, this event was of central importance because most of downtown Port Townsend and the residential areas on the bluff were spared the inevitable destruction that accompanies urban progress, leaving the town as a window into the urban past of the Puget Sound coast frontier.

**Fire Experience**

As was the case with Seattle, Port Townsend's first brush with the possibility of destruction by fire came during the Indian uprisings of the mid-1890s. Panicked by the news of the attack on Seattle, Port Townsend established a Home Guard under town founder Alfred Plummer, and built a log blockhouse. In 1856, the federal government established a military post known as Fort Townsend five miles up the bay, which led the Home Guard to relax its emphasis on armed defense and concentrate more on civic projects which included urban firefighting.

By the late 1880's, evidence suggests that Port Townsend had two volunteer fire companies, one in the Water Street business district and another on the bluff. Both were hose companies: Key City Hose Company #1 for downtown, and Company #2 for the residential area. Port Townsend
acquired a Sibby steam pumper engine around 1890, but there was no assigned engine company to operate it. Its care and maintenance were evidently the responsibility of the Fire Chief and the Chief Engineer, the only two paid employees of the department. Their salaries and the cost of the engine were paid by the city following the official formation of the Port Townsend Fire Department in that year, although all of the other firemen were still only volunteers.\textsuperscript{21}

As was the case with other North American volunteer fire departments, the Port Townsend group was more like a men's athletic club than a municipal safety agency. Although the chief was a political appointment, other officers were elected, meetings (or "drills," as they were called) were held at the fire hall on Monday nights, members with unexcused absences from drills or fires were fined, and participation in parades and athletic contests was a prominent activity--more so than actually fighting fires, if the relative space devoted to each in the various department ledgers and records is to be believed.\textsuperscript{22}

When new Port Townsend City Hall was dedicated on July 4, 1892, part of the ceremony included the unveiling of a new LaFrance 1500 g.p.m. steam fire engine. The new engine and its horse teams, as well as the department's meeting rooms, were relocated to the north wing of the new building. The older Sibby engine was moved up on the bluff to a shed in the base of a wooden bell tower that had been built by the volunteers in 1890 to ensure that fire alarms could be heard in both the upper and lower sections of town. The hose teams that were housed in the city hall fire station could be led up the hill and then hitched to the Sibby in case of an uptown fire.\textsuperscript{23}
The depression that gripped Port Townsend after the collapse of the railroad boom also affected the fire department. In the spring of 1895, the City Council—no doubt desperate to trim the municipal budget—slashed the department budget $35.00 a year by reducing both the number of drills and the amount paid per man per fire to $2.00. This was a severe blow to the firemen, who drafted a letter to the council which said, in part:

"... we have served this city long and well but with small remuneration and therefore we have rights which we demand shall be considered if this city wants good and efficient service on our part." 24 This revolt evidently fizzled and so, for that matter, did the Port Townsend Fire Department. Entries in the Key City Hose Company #1 Record Book thinned out to an average of one per year between 1896 and 1912. Fires obviously occurred and were fought during this period, but the formal organizational aspects of the department had collapsed along with the city's dreams.

Port Townsend before 1900 was a notably high-risk location for an urban conflagration: it was isolated, exposed to high winds much of the year, had no city water system until 1906, had a small and ill-equipped fire department even at its peak of growth, and only 45 percent of the commercial district was of masonry construction. 25 Nevertheless, the city was spared from a major conflagration of a scale comparable with Seattle, Bellingham or Vancouver, British Columbia. Throughout the city's evolution, building fires were usually contained within the structure of origin, with only a few exceptions. Consequently, Port Townsend has had no great "fire myth" with which to embellish local history, and those few which have been recorded are of considerably less importance than those in most other regional cities.
It is really not facetious to suggest that, after 1893, Port Townsend's leading industry was prostitution. Although there are no statistics to support this assertion, the fact remains that ships continued to call regularly long after the sawmill closed and the hotels and hardware stores boarded up their windows. So it was that Port Townsend's only serious conflagration did not begin in a mill, cannery or department store but, rather, in a Chinese bordello one block from City Hall. This 1897 fire destroyed an entire block of one- and two-room houses which constituted most of the red light district. Owing to the depressed economy, this area was never rebuilt but, instead, became a county football field and baseball park. In a similar vein, the town's second-most famous fire occurred when a disgruntled patron threw an oil lamp down the stairway of the Green Light, a small wood-frame "salon" next door to City Hall. History does not record whether the significance of this blaze lay in the threat to the municipal building until the fire was controlled, or in the loss of a business which, by virtue of its location, was of some significance in the city's economy.

Fire and Urban Morphology

As the preceding discussion suggests, the urban morphogenesis of Port Townsend was, unlike Seattle, little influenced by urban fires. This is in spite of the fact that, according to later reports by fire insurance surveyors, the city had the potential for a serious fire during most of its existence. While some of Port Townsend's good fortune in this regard may well stem from blind luck, there are also several morphological and economic variables to be considered.
Port Townsend's street grid, designed (or better, "applied") by an early pioneer developer named Pettygrove, ensured that there would be two distinct parts of town, as a street platted at right angles to the bluff above the beach had no hope of connecting the upper and lower grids without major earthmoving and grading projects. This resulted in two land-use zones, the residential above, and the commercial and industrial below. The dispersed nature of the former, along with the fact that after 1890 it had its own branch of the fire department in the center of the neighborhood, meant that a house fire was a distinctly less risky proposition than in cities where residences formed tight belts around commercial urban cores as in Seattle or Tacoma.

The relationship between the residential areas of Port Townsend and the more densely-packed commercial core is illustrated in the 1878 perspective view of the city (Figure 24). At this point, all of the business district was built of wood balloon-frame construction, and any building fires were dealt with by volunteer bucket brigades composed of citizens and crews of visiting ships. Interestingly, there is no record of any major fire in this area until the 1890's. It was perhaps in recognition of the fact that Water Street was a dangerous area from a fire standpoint that led the Bureau of Customs and the Jefferson County government to locate the Customs House (1893) and the Courthouse (1892) on the bluff rather than in the heart of the city.

It was in the matter of building styles and materials that Port Townsend's evolution was most distinct from that of Seattle, especially in the business district. Beginning in the late 1880's, the surge of investment capital that accompanied the railroad boom found expression in the rebuilding of the Water Street commercial district in structures of
FIGURE 24: Bird's Eye View of Port Townsend, W.T., 1878, showing the distinction between residential and commercial parts of the city. (Center for Pacific Northwest Studies.)
brick and stone. Because of the confined nature of the urban core, with no way to extend the district towards cheaper land and, most important, because there had been no conflagration (and precious few building fires) to eliminate the old wood-frame pioneer era structures, Port Townsend simply tore down and replaced its old core, one building at a time.

As a result, with no "Great Port Townsend Fire," the city was rebuilt in exactly the same fashion as post-fire Seattle. No better example exists of the similarity than the 1889 Hastings Building at the corner of Water and Taylor Streets (Figure 25). One of three local buildings by Seattle architect Elmer Fisher, it was designed at the same time he was building the Pioneer Building in Seattle, that city's most prominent post-fire structure and the inspiration for most of Pioneer Square's other buildings. Like the Pioneer Building, this three-story "fireproof" corner block is represented in the fire insurance diagram (Figure 26) as being of brick construction with wood window embayments and turret, with a central atrium and sheet metal sheathing on the facade to mimic the Italian Renaissance masonry details which characterize Fisher's work. Similar construction appears in the 1891 City Hall at Water and Madison (Figures 27, 28), although it is not nearly as well-detailed as Fisher's building.

The tremendous expense and physical isolation of the 1893 U.S. Customs House is apparent in Figures 29 and 30. This building is of brick construction, and faced with sandstone. It boasted both gas and electric lights, a steam heating system (note the location of the boilers, an obvious fire insurance consideration) and an internal hydrant and hose system, and occupied an entire city block; no conflagration of western shanties would ever approach these fortified federal walls! The difference in this Eastern-designed and federally funded building and those of
FIGURE 25: Elmer Fisher's 1889 Hastings Building on Water Street is structurally identical with his later works in post-fire Seattle. (Jefferson County Historical Society.)

FIGURE 27: The 1891 City Hall, prior to demolition of Tower and upper floor. (Jefferson County Historical Society.)

FIGURE 28: Insurance plan of Port Townsend City Hall from 1911 Sanborn Fire Insurance Atlas. (Washington Survey and Rating Bureau.)
FIGURE 29: The 1893 U.S. Customs House, deliberately isolated from the rest of Port Townsend's business district. (Jefferson County Historical Society.)

similar materials but designed locally, is truly striking, especially with regard to consideration for the danger of fire. To a slightly lesser extent, the same is true of the Jefferson County Courthouse (Figures 31 and 32), built of St. Louis brick and designed to resemble a medieval chateau by Seattle architect W. A. Richie. 29

The end result of the 1889-1891 building boom in Port Townsend is shown in Figures 33 and 34 where, in another downtown block, the dominance of brick and stone construction intermingled with older wood-frame construction (and, for that matter, newer concrete and steel construction) can be seen. It is blocks like these that typify the type of reconstruction of Pacific Northwest business districts during the end of the nineteenth century. Port Townsend's failure to continue to grow when bypassed by the railroads is all that saved these areas from being either destroyed or re-modeled beyond salvation, as was done in Seattle, Tacoma and most of Bellingham.

There is little to differentiate the residential areas of old Port Townsend from contemporary neighbourhoods in other regional cities, save perhaps for the fact that most are better preserved and less modified from the original (Figure 35). Figure 36 shows the 600 block between Adams and Quincy Streets, an area built during the 1890's. All these homes are of wood-frame construction, and by the time this plan was prepared, had been turned from single-family mansions to apartments. Note the lack of alleys--a feature not popular until several decades latter--and the addition of auto garages at the rear of two lots.
FIGURE 31: Jefferson County Courthouse, built in 1890 from St. Louis bricks and designed by Seattle architect W. A. Richie. (Jefferson County Historical Society.)

FIGURE 33: The north side of Water Street in 1890, showing the effects of the boom of the late 1880's. (Jefferson County Historical Society.)

FIGURE 34: Insurance plan of the same block from 1911 Sanborn Fire Insurance Atlas. Note intermingled masonry and frame construction. (Washington Survey and Rating Bureau.)
FIGURE 35: View of part of the bluff residential area of larger wood-frame Victorian houses, dating from the late 1880's. (Jefferson County Historical Society.)

CHAPTER 5

NOTES


15. Ibid., 11.


17. Ibid., 120.


22. *Port Townsend Fire Department, Secretary's Book*, April 30, 1890; June 26, 1890; see also *Key City Hose Company #1 Record Book* and *Port Townsend Fire Department Secretary's Book*, various entries, 1890-1912.


24. *Key City Hose Company #1, Record Book*, 114.


27. Ibid., 120.


29. Ibid., 301.
CHAPTER 6

BELLINGHAM

The founding and early growth of the City of Bellingham provides similarities with both of the two preceding settlements under discussion. Like Port Townsend, the Bellingham Bay communities failed to attract a transcontinental railroad terminus, and those parts of the city built in anticipation of this event were to languish for decades. In other ways, however, Bellingham was much more similar to Seattle (albeit on a smaller scale), for the city ultimately attracted three major railroad lines, and developed into a regional industrial centre for forest products, fish and fruit canneries, and a host of related activities. Until surpassed by Everett in the 1920's, Bellingham was the largest urban centre north of Seattle, with a hinterland that included most of the northwest corner of the state. ¹

Bellingham was the site of the second sawmill on Puget Sound, preceding Yesler's Seattle mill. The nucleus of the future city was a water-powered mill built at the mouth of Whatcom Creek in 1853 by Henry Roeder and Russell Peabody who were, like Yesler and others, attempting to cash in on the San Francisco "lumber rush" of the early 1850's. ² The mill site was chosen because of the power potential of the shallow falls at the creek's mouth, the denseness of the surrounding timber and the protected deep water anchorage of Bellingham Bay. The following year the bay acquired its second industry when a coal mine was opened on the opposite shore, the only such mine on the U.S. Pacific Coast at that time. The mining settlement was
MAP 6: SITES OF THE BELLINGHAM BAY SETTLEMENTS 1852-1854
(A) Whatcom; (B) Sehome; (C) "old" Bellingham, and "D" Fairhaven
(detail from U.S. Exploring Expedition, 1841, "Archipelago of Arro,
Gulf of Georgia, Ringgold's Channel and Straits of Georgia, Oregon
Territory").
named Sehome to distinguish it from the mill community, which was known as Whatcom.³

The San Francisco market for lumber withered soon after the sawmill's construction, and during the next few years only the town of Victoria provided a place to sell lumber and coal. In spite of this, the first of many economic depressions, the territorial government in 1854 created Whatcom County; the sawmill community of Whatcom was chosen as its seat of government. In 1856 a U.S. Army contingent arrived to protect white settlers in the aftermath of the Puget Sound Indian War of 1855-56, and built a stockade and blockhouse several miles west of the town.⁴

The 1858 discovery of gold on the Fraser River in what would later become the province of British Columbia made Whatcom and Sehome overnight boom towns, as thousands of miners from the now worked-out placer mining regions of California chose them as a "jumping-off point" for the new goldfields. Both tents and hastily-erected wood-frame buildings were put up to house these miners as they waited for a road to be cut through to the Fraser. But when Governor James Douglas decreed that all miners entering the colony required a permit obtainable only in Victoria, the boom faded as quickly as it had come. Many of the best buildings were actually knocked down and taken to Victoria, leaving behind a veritable ghost town.⁵

The Civil War and subsequent depression of the early 1870's were hard on the Bellingham Bay communities, but the sawmill ran more or less steadily supplying the local market until it was destroyed by fire in 1873. Fire also plagued the coal mines, which would periodically have to be flooded with seawater, then pumped dry, before production could continue. By 1883, both the courthouse and the newspaper--the only one of
either north of Seattle—had moved to LaConner in newly-created Skagit County. After a desperate search over several years, millsite owner Henry Roeder found a group of settlers from Kansas who agreed to build "a mill, a wharf out to deep water, a church, fifty dwellings, and to bring not less than 100 families to Whatcom." In return, the Washington Colony (as the group came to call itself) acquired title to the mill site and one-half interest in the surrounding townsite. This infusion of new blood, in conjunction with the early stirrings of the coming railroad boom of the late 1880's, resulted in a dramatic surge in the appearance and fortunes of the Bellingham Bay settlements. The new sawmill was in operation by late 1882, and in the following year formal plats for two other settlements, Fairhaven and Bellingham, were filed, bringing to four the number of towns on Bellingham Bay. Although a frustrated suitor for the Northern Pacific Railroad terminus which went to Tacoma in 1883, the Bellingham Bay towns competed vigorously (if not viciously) for the subsequent prize represented by the Great Northern Railway of James J. Hill. During the late 1880's, a host of investors, capitalists and would-be robber barons, some of whom were personally associated with the Hill interests, came to Bellingham Bay to erect a city worthy of the terminus title.

The building boom continued unabated through 1891, the year that the first transcontinental train reached Whatcom via the Canadian Pacific main line and a local connection to the tracks at Sumas. But in January, 1892, J. J. Hill picked Seattle as the Great Northern terminus and construction in the Bellingham area stopped literally overnight. The twin cities of New Whatcom and Fairhaven—-the result of the 1891 merger of Whatcom and
Sehome, and that of Bellingham and Fairhaven in 1890, respectively—lan-
guished through the Panic of 1893 and the bitter depression that followed.

After 1900, an improved national economy in conjunction with Belling-
ham's excellent natural resource base and its rail and dock facilities,
led to a much longer period of consolidation and steady economic growth.
This recovery was based primarily on the forest products industries, whose
sawmills and associated specialty mills (boxes, poles, ties, sash and door,
pilings, etc.) ringed the bay, but major contributions were also made by
salmon and fruit canneries, and the mining of coal and other minerals.
The First World War accelerated the city's importance as a shipping port
for minerals, timber and agricultural products, especially grain, and
created more new industries such as shipbuilding. This growth trend
was to continue until the Great Depression of the 1930's.

Urban Morphology

Bellingham's urban morphogenesis, like that of other Puget Sound
cities, occurred in three distinct phases: a pioneer phase of wood-frame
construction, followed by "fireproof" brick and stone commercial blocks
of the railroad boom era and, finally, after 1900, a move to steel, con-
crete and tile construction scientifically designed with fire resistance
in mind. As was the case with Seattle, the continuing growth of the
city, as well as urban fire, has eliminated most examples of the first
phase and much of the second. Fortunately, the existence of the almost
abandoned south side (Fairhaven) business district has provided the modern
observer with a window to the second phase, although it does not approach
that of Port Townsend, where failure to attract a railroad left the entire
process permanently arrested in this type of construction.

Of the four Bellingham Bay settlements which by 1903 had coalesced into the City of Bellingham, three produced wood-framed business districts: Whatcom, Sehome and Fairhaven; the fourth, "old" Bellingham, remained a residential area of rude cabins and, by the turn of the century, wood-frame houses.

The oldest of these urban nuclei was Whatcom, a ramshackle collection of wood-frame stores, hotels and houses that grew up on the tideflats around the Roeder Mill. Virtually all of these structures were built of native fir and cedar cut at the mill, and most were supported on pilings since high winter tides often reached the base of the timbered bluff. The townsite was formally platted in July, 1858, just several weeks before the surge of the Fraser River goldseekers inundated the community. By the end of the summer of 1858, Whatcom had dramatically increased in population, although the construction quality of most of the new buildings left something to be desired. The local newspaper described the boom in this fashion:

Any person visiting Whatcom after a week's absence would find it difficult to recognize the town. A fortnight ago, when the foundation of our office was laid, there was but one building west of it . . . Now there are at least a dozen erected and in process of erection. The grounds on the eastern side are also nearly all closed in, and the beach is dotted with over a thousand piles. In going up town, it is difficult to thread one's way; and each day changes the facilities for outlet through what were formerly vacant premises. 'Lumber; lumber'; is the cry. Give us plenty of this at reasonable rates, and the genii could hardly surpass our citizens in the rapidity of their building movement.11

This description of the almost overnight creation of what the Whatcom newspaper called a "Magic City" epitomizes the slapdash, jerry-built "temporariness" of pre-1890's Puget Sound urban building. After the
collapse of the gold rush boom and the wholesale move to Victoria, the only major building left was a two-story brick store built by Richards and Hyatt on "E" Street, constructed of the ballast from a sailing ship out of Philadelphia at the height of the boom (Figure 37). It survived to become the county courthouse and jail, and was the centre of the business district until the 1885 conflagration and following railroad construction boom.13

The second urban nucleus on Bellingham Bay was the settlement of Sehome on the east side of Whatcom Creek, and centered on the coal mine. The townsite was platted in 1858 and, until its union with rival Whatcom in 1891, was essentially a "company town" for the employees of the mines. Sehome's major morphological bequest to the future city of Bellingham was not any of its early wooden business district, little of which survived until the 1890's, but rather its "out-of-kilter" street grid. When later joined to the street grids of Whatcom, "old" Bellingham and Fairhaven, the result was a tangled nightmare which even today confounds those not born and bred in the city.14

If Whatcom was the child of the Roeder sawmill, and Sehome that of the Sehome Coal Company, then Fairhaven can best be thought of as the illegitimate offspring of "Dirty Dan Harris," a colourful entrepreneur who staked a claim at the mouth of Padden Creek on the south side of the bay. Harris built a hotel, store and wharf on his townsite, and made a living rowing between Fairhaven and Victoria, trading local goods and produce for whiskey. This he then sold to the local Indians, to the despair of virtually every other white settler on Bellingham Bay.15

When the railway rumours began to fly in the late 1880's, Harris pursued investors for Fairhaven with single-minded determination, for he was
obsessed with making his townsite the Great Northern terminus. He came remarkably close to success, for with the backing of well-known men such as Nelson Bennett, James Wardner and C. X. Larrabee, Fairhaven by 1891 had the most impressive brick and stone central business district north of Seattle, not to mention elegant residential areas on the hill above, an electric streetcar line, and deep-water wharf and warehouse facilities. When the Great Northern chose Seattle rather than Fairhaven, the dream died and old Fairhaven, much like downtown Port Townsend, became a living museum of 1890's-vintage urban architecture and planning.

Fire Experience

Fire played a major role in the growth of the Bellingham Bay communities, perhaps more so than in any other Puget Sound urban area. The first, and for many years the most destructive, of Bellingham's fires was the 1873 blaze that destroyed the original Roeder and Peabody sawmill. With the economic heart of the community stilled, Whatcom was plunged into a depression that caused a drastic population drop--only twenty families remained in 1880--and the previously noted loss of the newspaper and courthouse to the Skagit Valley. In neighbouring Sehome, coal mine fires necessitated periodic flooding of the mines which led to highly irregular coal production and consequent loss in production and delivery contracts.

But the most destructive fire in the city's history occurred in 1885, just at the end of the sawmill fire depression and the beginning of the railroad boom (Figure 38). On May 20 of that year, a fire began in the rear of the Steinweg Hardware Store. Raging out of control for hours, the flames consumed most of the business district. As there was no proper
FIGURE 37: The Richards and Hyatt hardware store, the oldest brick building in the state of Washington, still stands on "E" Street. (Center for Pacific Northwest Studies.)

FIGURE 38: Ashes are all that remain of early Whatcom after the 1885 Division Street fire. (Center for Pacific Northwest Studies.)
volunteer fire department, the conflagration was battled only by informal bucket brigades. Their efforts were abetted by a high tide, which reduced somewhat the length of the bucket lines but in the course of salvaging whiskey barrels from several threatened saloons, many of the firefighters became hopelessly inebriated. With this breakdown in discipline, a common occurrence in unorganized firefighting groups, all hope of stopping the fire vanished, and it burned itself out the following morning. 17

The cause of the Division Street fire was later proved to be arson, but no arrests were ever made. Many members of the business community who lost their buildings and merchandise were involved in the subsequent investigation. The fact that in such a small community the culprit was never found, in conjunction with the equally interesting point that most of them went on to great economic success in the "new" Whatcom that arose from the ashes, is a subject of possible speculation.

Curiously enough, the debacle of the drunken bucket brigades was not enough to lead to the creation of a volunteer fire department. But in January, 1889, another major fire occurred, this time in the Hayes and Merriam drygoods store. This two-story wooden building, erected just after the 1885 fire, was destroyed along with a newer adjacent building. The bucket brigades were hampered by snow, high winds and a low tide; within ten minutes of the fire's discovery, 600 citizens were bringing water to the scene from the water supply of a nearby stable. That the fire almost overcame their efforts is shown in an eyewitness account:

A man could not have placed insurance on a building within a thousand feet of the burning store at any figure. For fifteen minutes it seemed certain that all efforts to save the city were in vain, but at the end of that time a mighty shout went up for the grimy, shirtless, smoke-blackened leaders [those at the fire end of the bucket line] were conquering the fiend. In ten minutes more the last bucket was
emptied . . . and the crowd dispersed with the satisfaction of knowing they had done good work, for the fire was out.

In addition to water, the volunteers also used a type of firefighting grenade with some measure of success. 18

However, the pioneer era of small building and house fires with nominal losses was drawing to a close and, later in 1889, with the city at the beginning of the railroad building and investment boom, a formal volunteer fire company was created. The founders of this organization, known as Pioneer Hook and Ladder Company #1, were all merchants from the Whatcom business district. As was usually the case, the early records of this company reflect more interest in a choice of uniform colours and dates for balls and parades rather than on the more mundane business of acquiring firefighting equipment (Figure 39). A second company, the Whatcom Hose Company #1 was created the following year, and both were for a decade the mainstay of the city's social life: they marched in parades, they formed the city's only marching band and they sponsored numerous balls and athletic competitions. In all fairness, it should also be noted that these events were not totally frivolous as they were also intended to raise funds for company operations and equipment during the depression years of the mid-to-late 1890's. 19

During the 1890's, other volunteer fire companies were organized, usually under the sponsorship of one or more leading community merchants. In Sehome there was the Sehome Hose Company #1 and the Cosgrove Hose Company #2, the latter named for its sponsor. Fairhaven boasted the Bennett Hose Company #1 (1890), the Wardner Hose Company #2 (1890) and the Fairhaven Hook and Ladder Company #1 (1891). 20
FIGURE 39: Members of the Pioneer Hook and Ladder Company #1 pose in their dress uniforms, c. 1890. (Whatcom Museum of History and Art.)
The fire record of the twin cities of New Whatcom and Fairhaven during the 1890's appears to have been average for an urban area of its size. While a complete enumeration of fire losses is beyond the scope of this discussion, there are some salient points to be noted. First, the total number of annual alarms was rather small: in New Whatcom, for instance, the number ranged from six alarms in 1893 to a maximum of seventeen in 1895. The numbers were about evenly divided between house fires and those in stores or mills. House fires tended to be total losses, as was the case in 1896 of Mr. Bryant's two-story boarding house at Maple and Forest, a $1,000 loss—no amount of effort could save a fully-involved balloon-frame building of fir and cedar during this technological stage of urban firefighting. 21

Store fires were equally common, and though losses were usually higher because of the value of stock lost to both fire and water, in most instances the building was salvageable. The most spectacular of all fires during the decade of the 1890's were those occurring in waterfront sawmills. For instance, the first fire of 1898 did not occur until June 28, but when it did, it was in the sprawling Bellingham Bay Improvement Company Mill on the New Whatcom waterfront. Even with the assistance of the Fairhaven companies, the mill burned for three days and was a total loss of $250,000. 22

In Fairhaven, hardest hit by the collapse of the Great Northern bubble, incendiary fires in business blocks were commonplace in the early to mid-1890's. During the period from July, 1891 to June, 1982, there were fifteen alarms, all but two being termed "nominal" losses, but most were in vacant business blocks and supposedly of "incendiary origin." Most house fires during this period tended to be caused by either defective
chimney flues or the upsetting of oil lamps, although the exclusive residential area on the bluff west of downtown New Whatcom also had to contend with showers of sparks from steam locomotives in the railyards below.\textsuperscript{23}

As was the case with other seaports on Puget Sound, New Whatcom and Fairhaven took only a casual interest in an urban waterworks until the end of the nineteenth century. As early as 1884 a system to bring water from Lake Whatcom had been proposed, but was never funded.\textsuperscript{24} In 1887 a modest system consisting of a holding tank at Whatcom Falls and a series of wooden mains under the two principal streets in the business district was built. However, the firefighters were dependent on water from the bay until 1890, when the first hydrants were installed by a new water company formed by Pierre B. Cornwall, who was evidently seeking to protect his many real estate investments in downtown New Whatcom. The city purchased the waterworks from Cornwall in 1893 for $146,000, and subsequently made a number of improvements, including the use of iron and steel pipes rather than those of wood.\textsuperscript{25} Fairhaven had an even more primitive system built in 1890, which tapped Lake Padden; this system was not replaced until 1925, and lack of a reliable water supply was to inhibit fire control on the south side until then.\textsuperscript{26}

**Fire and Urban Morphology**

Bellingham's urban historians, like those of Seattle, have tended to emphasize the role of fire in the growth of the city, particularly the 1873 destruction of the Roeder Mill and the 1885 Division Street conflagration. But while these fires were central events in the city's history, their actual impact on the growth of the city was often less direct than implied
by early historians, especially Roth and Edson.

The first major fire in the city, the burning of the Roeder Mill, is cited by both Roth and Edson as a primary cause of the regional depression of the 1870's, because it "was one of the principal sources of income and employment for the district." 27

The mill was uninsured, and while Roeder wanted to rebuild it, the collapse of the New York Stock Market on September 18, 1873 dried up sources of money for reconstruction, and it was not until the arrival of the Kansas settlers a decade later that Bellingham Bay regained its saw-mill. However, if experience elsewhere on Puget Sound is any guide, there were few mills anywhere, burned or unburned, that operated during the depths of this depression. Therefore, it might be suggested that while the loss of the original mill to fire was indeed unfortunate, it was not simply the fire that led to the depression.

The great Division Street conflagration of 1885 also had only an indirect effect on the community's morphological evolution. The 1888 "birds-eye view" (Figure 40) of the town of Whatcom clearly shows the compact, wood-frame business district that was rebuilt after the fire as well as the open almost-rural residential areas beyond to the tree line. The destruction of the older business district resulted in no major morphological change at all, however, with the possible exception of a reorientation of the almost identical wood-frame buildings which replaced it to "C" Street, with old Division Street becoming an alley. 28

Because of the timing of the fire, four years before the great surge of railroad-inspired investment, all of this reconstruction was done in wood. Within one year of the creation of this rendering, Whatcom and Sehome were connected by an electric street railway line along the Holly
FIGURE 40: A perspective drawing of Whatcom in 1888. The cluster of buildings at right centre replaced the losses of the Division Street Fire of 1885. Note the dispersed residential areas on the bluff and the distinct treeline at the settlement's outer limit. (Center for Pacific Northwest Studies.)
Street/13th Street viaduct; in 1891, they merged to better compete with Fairhaven.  
With money available to build a modern central business district in brick and stone, there was little alternative but to either tear down the almost new wood buildings and replace them, or move the business district up the hill and away from the tideflats at the mouth of the creek. The latter course was chosen, and a new brick and stone business district arose along Holly Street on the east side of the creek.

At this point, based on the experience of Seattle and Port Townsend, it should be noted that had the Division Street Fire occurred four years later (or, for that matter, had the 1889 Hayes-Merriam fire gotten out of control, as it almost did), the central business district of Bellingham probably would have been rebuilt in brick and stone on either side of Whatcom Creek, rather than in its present location. While the destruction of the wooden core of old Whatcom did not lead to any type of more fire-resistant construction in the buildings which replaced it, it did, in an indirect fashion, cause the ultimate movement of the central business district. The insurance plan in Figure 41 represents a portion of the post-1885 brick and stone blocks erected further up the Holly Street hill east of the older district.

Fire played a much less significant role in the evolution of Fairhaven, Bellingham's south side business district. The masonry buildings erected during the 1889-1891 railroad boom were located several blocks further up the Harris Avenue hill from the original wood-frame business district created by pioneer Dan Harris and his associates. Most of these were two- and three-story business blocks of local brick and sandstone (Figure 42), clustered around the intersections of Harris Avenue and 11th and 12th Streets (see the 1890 view of Fairhaven, Figure 43).
FIGURE 41: New brick buildings erected on Holly, Bay and Commercial Streets east of the old urban core. The grey strip signifies a cast iron facade. (Center for Pacific Northwest Studies.)

FIGURE 42: The Mason Block, rebuilt in the early 1970's as a tourist arcade, was Fairhaven's most prominent office block in 1890. (Center for Pacific Northwest Studies.)
FIGURE 43: Perspective drawing of the Fairhaven business district in 1890. None of the wooden buildings at the foot of Harris have survived, but the new brick district at Harris and 12th is relatively intact. (Center for Pacific Northwest Studies.)
At least two of these--the 1888 Terminal Building and the 1890 Morgan Block--were wood-frame buildings which were given a brick facade to allow them to better compete with other masonry buildings.31

After the collapse of the building boom in January, 1892, the upper floors of this group of buildings were abandoned, and many survived to become tourist attractions in the 1970's. Like Port Townsend, they remained a well-preserved cluster of architectural fossils which are excellent examples of late nineteenth century construction technology. Unlike Tacoma, Fairhaven failed to attract even arsonists in the post-boom years, for any type of fire insurance for these buildings was soon allowed to lapse. One uncompleted structure, the 1891 Waldron Block, was severely damaged by fire in 1894; the centerpiece of Victorian Fairhaven, the spectacular Hotel Fairhaven (Figure 44), survived until 1954 when it was levelled by a major fire.

The attitudes of Bellingham Bay residents toward urban fire during the last decades of the nineteenth century were not appreciably different than those of Seattle or Port Townsend. However, the extremely depressed state of the local economy until the late 1880's prevented the dispersed settlements from providing even the most basic fire protection. As suggested above, it was only sheer luck that saved the business district on several occasions.

As with Port Townsend, the construction of joisted brick business blocks during the railroad boom had less to do with fear of fire than simply trying to "look good" for visiting investors. This emphasis on rapid construction of a type of building that was little more fire resistant than its wooden brethren, with little or no regard for spacing or exposure, was to come back to haunt Bellingham in the early twentieth century.
FIGURE 44: The Hotel Fairhaven, centre-piece of the 1890's CVD of south Bellingham. (Center for Pacific Northwest Studies.)
CHAPTER 6

NOTES


2. Roth, History of Whatcom County, 13.

3. Ibid., 42. See also James W. Scott and Daniel E. Turbeville III, Early Industries of Bellingham Bay and Whatcom County (Bellingham: Fourth Corner Registry, 1980), 19-59.


5. Roth, History of Whatcom County, 106.

6. Ibid., 141.

7. Ibid., 222.


11. Northern Light, July 10, 1858.

12. Roth, History of Whatcom County, 106.


16. Roth, History of Whatcom County, 221.


20. Ibid.

21. Ibid.

22. Ibid.

23. Ibid.

24. Roth, History of Whatcom County, 249.

25. Ibid., 250.

26. Ibid., 605.


28. Ibid., 219.


CHAPTER 7

TACOMA

Second in size only to Seattle among the Puget Sound settlements, the origins and early growth of the city of Tacoma provide interesting counterpoints to those of her northern rivals. Although Tacoma successfully achieved the dream of becoming the Northern Pacific Railroad terminus—thought to be the key to regional urban power and expansion—she was unable to compete with Seattle during the decades following the arrival of the rails, and by 1900 was firmly entrenched in a secondary status. At least one Pacific Northwest historian has waggishly suggested that it was because Tacoma never had a conflagration on the scale of Seattle's that her downtown business district never could compete with post-fire Seattle. Whether or not this might be true is one of the fire-related points to be examined in this discussion.

As was the case elsewhere, there were two pre-1900 Tacomas: the pioneer settlement and the subsequent railroad-created seaport city. The site of the first settlement was, as had been the case with Seattle, Port Townsend and Bellingham, a deep sheltered bay with adjacent uplands covered with dense timber which could be easily felled and floated to a central point for cutting and shipment (Map 7). The city's founder, Job Carr, was a Civil War veteran who sought to establish his 320-acre homestead claim in 1864 on a point on Puget Sound where the rails of the newly-chartered Northern Pacific Railroad would most likely arrive. Unlike his midwestern forebears, and very much like his contemporaries, Denny, Roeder
MAP 7: SITE OF THE TACOMA SETTLEMENTS, 1853
(detail from U.S. Exploring Expedition, 1841, "The Narrows at the entrance to Puget Sound with Commencement Bay, Colvos Passage and a part of Admiralty Inlet, Oregon Territory.)
and Plummer, Carr had no interest in farming his homestead claim for any other reason than initial subsistance, for he too dreamed of building a city in the wilderness that would become an entrepot on the road to the riches of the Orient.

The shoreline of Commencement Bay was, in fact, such an obvious place for a settlement that it should be fairly noted that Carr was not the first arrival. The Hudson's Bay Company had a small agricultural plot in the area, and in 1853 a Swede named DeLin had built a small sawmill at the head of the bay, to the delight and fascination of hundreds of native Indians who spent hours watching the simple machinery perform its designed tasks. The little settlement centered on Carr's original claim was bought out in 1868 by a group of railroad-inspired investors led by General Morton Matthew McCarver, who proceeded to plat a townsite, attract a major lumber firm and otherwise begin to groom the village for future greatness. The new town was originally named Commencement City, but this was soon replaced by the more euphonious "Tacoma," the Indian name for nearby Mt. Rainier.²

Tacoma's street grid was designed by Northern Pacific surveyor James Tilton. As elsewhere on Puget Sound, Tilton oriented the main street—in this case, Pacific Avenue—parallel to the waterfront and based a Philadelphia-style grid upon it.³ The creation of Tacoma in this overnight fashion foreshadowed the announcement by the executive committee of the Northern Pacific that they had chosen this site over Seattle and other Puget Sound settlements. On July 3, 1873 they telegraphed to McCarver: "We have located the terminus on Commencement Bay." The reason for Tacoma's choice was straightforward: here the railroad could build its own city without having to negotiate with extant communities. By Christmas of that year, tracks had been laid from Tacoma to Kalama on the
Columbia River, and the fledgling city prepared itself for a rush of investors.⁴

The great economic crash of 1873 intervened abruptly, however, toppling the National Pacific Railway's financial leader, Jay Cook. It was to be fourteen years before the 1500-mile rail gap between Kalama and Bismarck, North Dakota was filled in. The railroad's subsidiary Tacoma Land Company, desperate to begin selling lots in the new city, turned to Frederick Law Olmsted--the nation's best-known urban landscape planner--to redesign the entire city, in hopes of attracting investment.⁵

In six weeks, Olmsted--working from only sketches and topographical maps--produced a "dazzling plan" of contour-oriented streets and avenues, but which "drew ambivalent reactions at best." Locals were outraged that "... there wasn't a straight street, a right angle, or even a corner. The blocks were shaped like melons, pears and sweet potatoes" (Map 8). The real estate community was particularly upset about the consequent lack of corner lots, the mainstay of western urban land promotion, and moaned:

No one could sell a crooked lot to an honest Iowa farmer. The plots must be rectangular and there must be plenty of corner lots for the prairie states people to buy sight unseen.⁶

As a result of adverse local reaction and the depth of the ensuing depression, the Olmsted Plan was shelved, and what might have evolved into the Pacific Northwest's most distinctive and picturesque city instead became a clone of its sisters, as an 1878 urban view (Figure 45) clearly illustrates.

Tacoma languished until the early 1880's, when work resumed on the Northern Pacific; under the leadership of rail magnates such as Henry Villard, the tracks were completed over the Cascade Mountains in 1887,
MAP 8: THE OLMSTED PLAN FOR TACOMA, 1873
(University of Washington Library, Photograph Collection.)
FIGURE 45: "View of New Tacoma and Mount Rainier," an 1878 "bird's eye view" of Tacoma (Center for Pacific North-west Studies.)
and the greatest of Tacoma's economic booms began. In 1888, work was begun on a million-dollar smelter to service "the mines of South America and Alaska" and a sawmill and wood products factory that in a few years would, as the St. Paul and Tacoma Lumber Co., become the largest operation of its kind in the world. The general atmosphere of this period is captured in the comments of visiting British journalist Rudyard Kipling who, in 1889, came north from San Francisco to witness a classic example of American "town-booming":

I do not remember what Tacoma's natural resources were supposed to be, though every second man shrieked a selection in my ear. They included coal and iron, carrots, potatoes, lumber, shipping and a crop of thin newspapers all telling Portland that her days were numbered . . . On the streets--the rude, crude streets . . . --men were babbling of money, town-lots and again money . . . .

Tacoma's great industrial and real estate boom died with the Panic of 1893. Not coincidentally, this was the same year that James J. Hill brought his Great Northern Railway and its associated steamship line to the Orient into Seattle rather than Tacoma. For the rest of the decade, Seattle grew steadily while Tacoma's population began to slip. Many of these people were builders and tradesmen seeking work in the reconstruction of post-fire Seattle. Hence, Seattle's rebirth was largely at the expense of unburned and economically moribund Tacoma.

The final stroke was Seattle's success in making itself the centre of the Alaska and Yukon gold rushes of 1897-98. As they had in the post-fire building boom of 1889-92, Seattle's public relations groups so dominated the Eastern press reports of gold rush news that Tacoma and other Puget Sound cities could hardly be heard above the uproar. Morgan notes that in the workbook of the Tacoma local of the International Longshore Worker's Union, there is only one entry for the year 1897: "Nothing worth noting took
place during this year with the exception of the Klondike Rush."¹⁰

Fire Experience

Tacoma's experience and response to the urban fire hazard during the nineteenth century was largely influenced by the fact that during virtually all of this era it was a "one-company town," the company being the Northern Pacific Railroad and its various agencies. As early as 1880, the city was billing itself—and not without good reason—the "lumber capital of the world." The concentration of mills on Commencement Bay and the dangers inherent in their highly flammable structures, stocks and machinery, meant that adequate means of firefighting were a major concern in the early life of the community.

The first volunteer fire company was formed on May 19, 1882, the earliest such company in the region. Evidence suggests that the New Tacoma Hook and Ladder Company #1, although sponsored by several prominent merchants, had at least some financial support from the newly-formed city government as well. The town's first recorded fire came two years later when a downtown druggist took a lighted candle into his basement to open a can of gasoline. The drugstore and living quarters above were a total loss of $19,000. The following day saw the formation of another group of volunteers, the Commencement Hook and Ladder Company #1, suggesting that the town had already outgrown the capabilities of the original group.¹⁰

A reorganization of city government in July, 1884 created a commission form of municipal administration which provided for a Commissioner of Public Safety. As a result, both firefighting and expenditures for the volunteer companies' equipment were brought under one office, giving Tacoma
a better-organized fire department than any other Puget Sound city. An-
other provision of this reorganization was the merger of both privately-
sponsored volunteer companies into one publicly-supported hook and ladder
company.

Tacoma suffered its first major conflagration in April of 1884, when
a lamp was upset during a drunken party at a house on Pacific Avenue.
Although the volunteers arrived in only fifteen minutes, an entire block--
fourteen wood-frame stores--was lost, largely due to an inadequate water
supply. Further losses were precluded by a sudden rainstorm, which allowed
other citizens to attack the flames with wet blankets and clothing. The
$130,000 in losses included Tacoma's first brick building, a bank which
had been built in 1876.11

One of the merchants wiped out in this blaze, a shoe store owner named
Simons, was so distraught about his loss that he built four large wheeled
bins for his new store, so that in case of fire he could throw his stock
inside and wheel it to safety! But, alas, three months later a building
fire in the next block north on Pacific Avenue got out of control and de-
stroyed 32 buildings, including not only the new shoe store but the new
bank and all of "Whiskey Row," the saloon and "entertainment" district
as well.12

During 1884 and 1885, the wooden core of Tacoma was ravaged by a
series of fires, many of which were probably deliberately set, according
to fire department historians Clyde Talbot and Ralph Decker. Given the
times--the beginning of the great Northern Pacific Railroad land boom--it
was often imperative to "clear a building site" on short notice, and arson
was a popular and inexpensive way to do it. As few buildings during this
period were insured against fire, arson was apparently more of a "sporting"
FIGURE 46: Tacoma in 1871, prior to the arrival of the Northern Pacific Railroad (Tacoma Public Library).

FIGURE 47: After the conflagrations of the mid-1880's, Tacoma invested in a new steam fire engine. The inscription on the new firehouse reads "Our Boys, 1887." (Tacoma Public Library)
FIGURE 48: A typical example of wood frame construction in Tacoma during the 1880's, the "Theatre Comique" was by any standard a firetrap. (University of Washington Library, Photograph Collection.)

FIGURE 49: The "Active Hose Company #1," shortly after its 1885 formation. Note the fancy dress uniforms and the "man-powered" hose cart (Washington State Historical Society).
means of real estate enhancement rather than the major criminal act it later became, and serious criminal investigations seem to have occurred only in cases of loss of life.

City government responded to these conflagrations by creating four more hose companies between March and August of 1885. Also, a central fire hall was built at the foot of 13th Street to house the growing amount of equipment: one hook and ladder wagon, two hose carts, 3200 feet of hose and large quantities of chains and hooks for pulling down frame buildings. Another major civic enterprise was the construction in 1885 of Tacoma's first waterworks, a flume from Spanaway Lake feeding a system of underground wooden mains and forty new fire hydrants in the business district. But the capstone of Tacoma's fire consciousness during this period was the 1889 purchase of a Gamewell fire alarm system. Electric wires connected 28 call boxes around town with the fire station beginning in June of 1889. This technological advance, along with the purchase of horses to pull the hook and ladder wagon, was believed to be a major breakthrough in urban fire control.13

The Great Seattle Fire of June 6, 1889 had a marked effect on cities all along the West Coast, but nowhere did it have the impact that it did on Tacoma. When a call for assistance was telegraphed to Tacoma by the overwhelmed Seattle department, a steam locomotive and flatcar delivered the new hose wagon and a team of firemen in only 63 minutes, while a second hose company was assembled and dispatched an hour and a half later. Other Tacomans, putting aside the bitter rivalry with Seattle, assisted in a relief effort which consisted largely of food, clothing and tents for the homeless fire victims. It was later noted that Tacoma enjoyed a "quiet pride" for years thereafter that "... they never had to call on the
Seattle fire department to help put out any fire . . . ."14

The Seattle fire marked the end of Tacoma's volunteer fire department, however, for two weeks later the city council voted to put the volunteers on salary. The rationale offered was that firefighters who were full-time professionals would be better equipped to deal with arson fires, for it was widely believed at the time that Seattle's blaze had been incendiary in origin. The council also appropriated funds to buy four steam fire engines and the horses necessary to pull them. The resulting department was not only the first paid department in the state, but one of the best-equipped as well.15

Tacoma's transition to a professional department with the latest steam equipment pointed up two major deficiencies, however, one political and the other physical. The political problem was one shared by most other North American departments: every time a civic election resulted in a change of administration, there were also changes in the fire and police departments. Certainly by the end of the century the office of fire chief rivalled that of police chief as being a political plum as much as a professional billet, and many future politicians--especially big-city mayors--achieved their offices via the fire department promotional ladder. From the 1890's on, much of the relationship between the fire department and the city council was coloured by partisan political squabbles over issues ranging from firehouse locations to equipment appropriations and hiring policies.16

The second major deficiency revealed at this time was the inadequacy of Tacoma's water system. After a series of disastrous fires during the early nineties, it became apparent that the pumping capacity of the new steam engines grossly exceeded the amount of water that the old fire mains could supply. And there were other problems as well: the lack of a fire-
boat for access to docks and waterfront warehouses was one; another was
the impassability of unpaved streets and alleys during the wet winter
months.

But it was ultimately the Panic of 1893 which led historians to term
the decade the "Fiery Nineties." The 1894 election of Mayor Edward S.
Orr on a "budget reduction" platform led his fire chief appointee, A. J.
Bruemmer, to make deep cuts in the fire department. Several companies
were pulled from service, and only with the help of donations from con-
cerned merchants could the horses be fed and the reduced payroll met.
With the threat of a citywide firemen's strike in 1896, merchants were
able to pressure the city council to scrape up what had become $62,000 in
back pay owed to the firemen. 17

Arson proved to be a serious problem during the mid- and late nineties
as well. Unlike the depression of the 1880's, when few of Tacoma's wood-
frame buildings were insured, the higher investment in the brick and stone
business blocks of the 1889-1892 boom required--usually at the insistence
of Eastern investors--at least minimal coverage of a building and its con-
tents. In fact, the few fire insurance companies operating in the city at
this time had threatened the city council with cancelling all business
district insurance policies if the firemen were permitted to go on strike.
Throughout the decade, desperate businessmen--typified by one described
by Quiett, who was reduced to operating the elevator in his own building--
sought to convert vacant structures into enough cash to leave town and
start business elsewhere by "torching" their own property. 18

On some occasions, arson was directed at business rivals or, because
of its "company town" status, against the railroad and its land company.
All too typical was the case of the magnificent Tourist Hotel, situated
on the bluff overlooking the harbour. A pet project of Northern Pacific
president Henry Villard, this immense French chateau-style hotel was to
have dominated the Tacoma skyline (Villard had been inspired by the Chateau
Frontenac at Quebec City). After an investment of half a million dollars,
the Panic of 1893 prevented completion, and the hotel stood empty for five
years. On the night of October 11, 1896, an arsonist doused a pile of
shingles in the hotel's south wing with naptha and ignited it; the result-
ing blaze was Tacoma's largest to date, and one which had far-reaching
economic implications as well. Ultimate completion of the hotel was the
keystone to the Northern Pacific Railroad's plan for Puget Sound, and the
$150,000 uninsured loss of the building was a major factor in driving the
company into bankruptcy. Eight years later the shell was rebuilt as Stadium
High School, described with monumental understatement by architectural his-
torians Woodbridge and Montgomery as "the grandest high school on the
west coast." 19

Fire and Urban Morphology

If it can be said that the urban conflagrations of the late 1880's
affected the morphology of Seattle and Bellingham, then it is equally true
that the lack of a major fire in Tacoma similarly affected its urban de-
velopment. In fact, it could be postulated that Tacoma's initial success
as the terminus of the Northern Pacific worked against its later opportu-
nities for becoming the regional metropolis that Seattle became.

During Tacoma's great rash of arson fires during 1884-1885, virtually
all of the buildings destroyed were wood-frame business blocks. Many of
these were replaced with "fireproof" brick and stone structures: during
the summer of 1889, for instance, twenty-seven new brick buildings went up in the business district to replace arson losses. Even at this relatively early date, it was easier to secure financing for a brick building in a terminus city than it would have been in, for instance, Seattle or Bellingham. The arson plague continued into the Great Northern railroad boom of the late 1880's, even to the point where vigilante methods of response to arson were considered and the City Council appointed a 25-member "Committee of Safety" to investigate and prevent further incendiary fires. This transition to a dense core of brick and stone building construction is shown in Figures 50 and 51.

From a morphological standpoint, the end result was that by the early 1890's, the business district of Tacoma was composed almost entirely of five-to-ten-year-old joisted brick business blocks. This core of what by 1900 had become technologically obsolescent buildings, spread along the entire waterfront bluff with no place to expand and, protected by the most efficient and well-equipped fire department in the region, was a contributing factor in Tacoma's stagnation during the later 1890's.

The confinement of the business district on the bluff above the waterfront mills, warehouses and railyards is worthy of further exploration, for had Tacoma been able to move out into the Puyallup tideflats at the head of Commencement Bay, her morphological development would have been entirely different. But the Indian treaties of 1855 had given title to these tideflats to the several tribes of local natives as a reservation area. It was not until after the 1900 creation of a land commission that private interests were able to acquire land in this area, thus freeing the tideflats for the growth of industry and wharf facilities. But by this point Seattle had filled in the mouth of the Duwamish River tideflats with fill from the
FIGURE 50: The masonry facades of Pacific Avenue in the 1890's, looking south from Ninth Street. (Tacoma Public Library.)

FIGURE 51: One of Tacoma's grandest new brick buildings was the General Office Building of the Northern Pacific Railroad. (Center for Pacific Northwest Studies.)
various regrade projects, giving it a tremendous head start over Tacoma in the areas of cargo handling and shipbuilding.

Downtown Tacoma's morphological evolution during the 1890's is clearly represented in Figures 52 and 53, details from the 1912 Sanborn Fire Insurance Atlas. Here the virtually all-brick commercial district occupies the length of Pacific Avenue, its parallel avenues and side streets. To the east, below the bluff and across the railroad tracks, is the waterfront warehouse and industrial area of wood construction; to the west is a largely wood-frame residential area. Also apparent is one major advantage to Tacoma's railroad-designed grid: in comparison to pre-fire Seattle or any other Puget Sound cities, the city blocks are long and thin, with wide streets between. This provides firefighters with much better access to building fires, for most of these structures are accessible from both front and rear.
FIGURE 52: Tacoma's CVD as built in brick and stone, showing the long narrow blocks (orange-coded buildings are of post-1900 origin). (Washington Survey and Rating Bureau.)

FIGURE 53: Detail from 1916 Sanborn plan showing construction details of a typical nineteenth century block of Tacoma buildings. Note access from both Commerce and Pacific Avenues. (Washington Survey and Rating Bureau.)
CHAPTER 7

NOTES

1. Lecture by Professor Keith A. Murray, Department of History, Western Washington University, November 12, 1969.


4. Quiett, They Built the West, 412.


9. Ibid., 301.


11. Ibid., 12-14.

12. Ibid., 14.

13. Ibid., 15-16.


15. Ibid., 18.

17. Talbot and Decker, 100 Years of Firefighting, 21.

18. Quiett, They Built the West, 428.

PART II

CONCLUSIONS

The preceding four chapters on the relationship of fire and urban growth in the cities of Seattle, Port Townsend, Bellingham and Tacoma have suggested that this relationship was perhaps more complex and indirect than previously suggested. At this point, a review of the effect of urban fires in general, and major conflagrations in particular, on the major aspects of urban morphology is in order.

Fire's effect on street patterns in the study area was minimal, except in the case of Seattle. The replat of the central business district carried out in late 1889 resulted in the widening of the north-south numbered avenues, ostensibly to reduce overhanging exposures on this steep slope. Otherwise, only the early phase of a program to reduce street grades by hydraulic sluicing contributed to fire safety, and that was apparently incidental to simply improving the access to the business district by horse-drawn wagons. In the other three cities, none of which had Seattle's problem with topography, the street patterns and widths laid down by the first arrivals have remained unchanged; in fact, these often mismatched grids are a morphological characteristic of most western cities.

Urban land use was more directly affected by the threat of fire in the study cities. While all four settlements were initially clusters of wooden stores and houses around a waterfront sawmill, the arrival of the railroads tended to create an open buffer zone of tracks between flammable sawmills and docks and the business district. Note, however, that this act of conflagration prevention was the result of purely economic
factors rather than legislation. Within the business district, relatively "high-risk" activities were permitted with little or no municipal control until after 1900. This lack of land- or building-use control was a direct factor in the Great Seattle Fire, with paint and cabinetmaking activities going on immediately adjacent to alcohol and explosives storage.

The most obvious failure to deal with the urban fire hazard was the case of building technology. As previously suggested, urban historians of the study area have tended to overemphasize the role of improved building technology after 1890 as a factor in reducing fire losses. The failure of what was believed to be a major technological advance is nowhere better illustrated than in the case of Seattle. The replacement of the burned-out wood-frame urban core with larger "fireproof" masonry buildings was not occasioned solely by the conflagration: the transition to masonry construction had begun some five years sooner, as the illustrations clearly show. Furthermore, the post-fire buildings were, from the standpoint of fire safety, technologically similar, and included all of the dangerous features--softwood joists, floors and walls, wood truss roofs covered with tar, exposed wooden window frames with unprotected glass, and open light wells and stairways--of their doomed predecessors.

When the Seattle experience with building technology transition is considered in light of the fact that the other three cities performed the same feat without a similar conflagration to spur the change, the weakness of this theory is exposed. For instance, Port Townsend--Seattle's virtual twin city before 1889--rebuilt its entire business district without any major fires at all.

A final point that emerges from Part II is one that has not been mentioned: the timing of an urban conflagration. Much less has been
made of the fact that the Seattle fire occurred at an ideal point in the
city's morphogenesis because it eliminated the old wood-frame district.
With the beginning of the railroad boom, this allowed the construction of
a new and modern business district which, in turn, enhanced further growth
and investment. This is undeniably true, of course. But consider the case
of the 1885 Division Street fire in Bellingham, where the earlier date of
the fire meant that the money and the building expertise that would have
been available later were not. As a result, a soon-to-be obsolete busi-
ness district was rebuilt of balloon-framed softwoods, forcing the move-
ment of the later masonry business district away from the original urban
core. This movement was further enhanced by the services of an electric
street railway system and available land for expansion.

In a similar fashion, the reconstruction of burned areas of downtown
Tacoma in 1884-1885 in brick and stone—materials more advanced than those
available in Bellingham because of the presence of the railroad—resulted
in a similarly obsolescent commercial district by 1900. Tacoma's problem
was compounded by its inability to expand onto the adjacent tideflats dur-
ing this period, resulting in the constriction of her vital street and
rail arteries.

Finally, the absence of a major urban fire was also a morphological
determinant, as shown by the case of Port Townsend. Without the benefit
of a conflagration, this seaport town also rebuilt its urban core in brick
and stone, but to no avail. Bypassed by the transition from water to rail
transportation, Port Townsend withered on the economic vine in much the
same fashion as old Fairhaven on Bellingham Bay. So rapid was the collapse
of these two Victorian cities that even arson lacked any economic attrac-
tion. Hence, fire was of little or no morphological importance to either,
except that occasioned by its very absence.
PART III

CONTROLLING THE URBAN FIRE HAZARD

1901–1920
INTRODUCTION

By the beginning of the twentieth century, North American fire losses were the highest in the world. While such losses were taken for granted during the rush to settle the continent, the ending of the frontier in the 1890's and the rise of the Progressive movement at the same time led to a concern for conservation of natural resources which would ultimately attempt to come to grips with the urban fire problem. In the introduction to one of the earliest treatises on dealing with urban fire, Joseph Freitag observed:

... our annual fire waste resulting from the burning of buildings and contents, added to the wide-spread destruction of our forests by fire, is undoubtedly the greatest obstacle to be overcome by those who believe in any rational plan for the conservation of our national resources. ¹

Freitag and others continually compared North American fire losses with those of Europe, which were substantially lower: a 1901 comparison revealed that per capita fire losses in the United States were ten times greater than for six selected European countries. ² Spurred by losses such as these, the American response to the urban fire hazard began to take shape in the early 1900's, spearheaded by the largest and most powerful fire insurance firms. ³

This continental trend was apparent in the study cities of the Pacific Northwest by the turn of the century. It was most visible as a trend toward "Easternization" in virtually every aspect of urban life, from industry to transportation and communication. While the role of railroads,
banks, utility firms and forest industries have generally been acknowledged in regional urban history, Part III of the thesis will explore the effect of large Eastern fire insurance firms on regional attempts to deal with the prevention and suppression of urban fires in the study cities.

NOTES


2. Ibid., 11-13.

In the preceding section on fire in frontier settlements of the North Pacific Coast, there is relatively little reference to the question of fire insurance and its effect on urban growth in the region. After 1900, however, fire insurance companies began to play a more visible role in urban development in the study region, as the Pacific Northwest was integrated into the national economic system to which it had previously been merely a distant supplier of raw materials. By the first decade of this century, large insurance firms—and especially "public interest" consortiums of fire insurance interests—were playing a dominant role in the urban morphogenesis of our four study cities by forcing local builders, investors and government officials to conform to standards derived elsewhere in North America.

The basic concept of fire insurance is a critical one in understanding the process of urban growth (as previously noted), and its application is closely bound to geographical factors. Like its direct ancestor, marine casualty insurance, fire insurance allowed economic risk to be spread over a geographically dispersed group of investors. This allowed an increased level of investment in buildings and other structures which could not otherwise be afforded. The price for this freedom to "overinvest," paid out as annual premiums to the insurers, was a declining amount of local control over urban form and structure. As a result, fire insurance corporations cannot be ignored as a major contributor to the increasing similarity of North American business districts, industrial areas and suburbs during the
course of this century. The following is presented as an overview of the effect of the fire insurance industry on regional urban form in the Pacific Northwest, both before and after 1900.

Fire Insurance in North America

Fire insurance in its present form had its origins in the Great London Fire of 1666, an event contemporary with the early years of colonial North American urban development. Largely as a result of increased interest in England in securing coverage for homes and commercial buildings, there later appeared in North American colonial cities similar insurance organizations. By the end of the eighteenth century, a number of British fire insurance companies, as well as indigenous colonial firms, were insuring property in major American cities. The industry was centered in Boston, New York and, most notably, in Philadelphia, but several smaller cities were also prominent, including Providence and Hartford.¹

While a detailed examination of the American fire insurance industry before the Civil War is beyond the scope of this discussion, there are a few general points that should be mentioned. First, the business was initially dominated by a group of stock insurance companies based in the above-noted cities. A major conflagration in New York in 1835 caused the financial collapse of that city's fire insurance community, and significant growth in that of nearby Hartford; secondary results of this great fire were the beginnings of mutual insurance in North America, and also the earliest state insurance regulatory laws.² But probably the most distinctive feature of early nineteenth century fire insurance was that policies were highly individual, tailored to suit the property being insured and
reflecting the interests and skills of both the insurance agent and his underwriters.

By the end of the Civil War, this system was rapidly breaking down. Arson fires in large eastern cities in the economically unstable postwar years were a major problem, and caused the collapse of many small or poorly managed companies. Even worse was the opening of the great timber belts of the Great Lakes and Pacific Northwest states, which meant the almost exclusive use of wood in early western urban construction: "A small fire starting in a town or village of the West was sure to sweep the entire place out of existence as nearly all . . . were unprotected." Other contributing factors were cut-throat rate wars among competing companies, and the entry of irresponsible investors into the virtually unregulated market.

**The National Board of Fire Underwriters**

On July 18, 1866, representatives of seventy-five fire insurance firms met in New York to attempt to deal with the dual problems of arson (or "post-Civil War incendiarism," as one insurance historian called it) and rate competition. The result was the creation of the National Board of Fire Underwriters (hereafter NBFU) and a turning point in North American insurance history.

The most important function of the NBFU in its early existence was to serve as a rate-fixing cooperative, "... in order to secure adequate rates and promote their [the member companies] general welfare [by reducing] the great waste that was occurring year by year through destruction by fires." In this effort they were tremendously successful, for by 1874 the NBFU companies took in 90 percent of U.S. fire insurance premiums, and represented
95 percent of the nation's fire insurance capital. They were helped in no small way by the great 1871 Chicago conflagration, and another in Boston the following year, both of which served to eliminate most of the remaining small, independent companies. With a virtual monopoly on fire insurance, the NBFU became the "first great American trust," setting the pattern for later and better known monopolies—railroads, iron and steel, oil—and, ultimately, the backlash that came to be known as the Progressive Era.

Despite this negative aspect, however, the NBFU made great strides in protecting cities and, rather coincidentally, human lives, from fire. As early as 1868, standards for fire protection in specialized industries—woolen mills, sugar refineries, etc.—were being formulated, and attempts were made to write a standard fire insurance policy to streamline what had become a major obstacle in underwriting. After the Chicago and Boston conflagrations, the NBFU began to force, rather than simply espouse, urban fire control measures. These included establishment of fire limits, improved building laws, fire department reorganization, water system improvements, appointment of fire marshalls for arson investigation, and laws to remove special hazards. In Chicago, the mere threat of member companies to discontinue underwriting in the city was enough to frighten citizens into rushing legislation to comply with these measures.

One area in which NBFU policies were to exert visible influence in cities of the Pacific Northwest was the organization's crusade for better building construction. The Boston fire had demonstrated that a brick and granite business district was not immune to conflagration, especially when building interiors were of wood-frame construction and contained unprotected vertical openings such as stairwells and elevator shafts. Also, the popular wood mansard roof—a staple of Victorian architectural design—was singled
out as a special hazard, owing to its relative inaccessibility to fire-fighters: "... they were fire traps for spreading flames during a large fire." 9

An immediate result of the great conflagration losses of the early 1870's was a sharp increase in fire insurance rates in order to save many of the smaller firms. While the precise relationship of this nationwide rate increase, the national economic depression of 1873 and the beginnings of the populist revolt against big business across the United States are well beyond the scope of this inherently regional discussion, it is to be noted that state regulatory legislation directed at fire insurance firms soon began to appear. Evidently as a result of government pressure, the NBFU ceased to establish rates in 1877. Almost immediately, the insurance business was plunged into chaos, and state governments stepped in to form regulatory agencies to protect both the companies and the insured parties. 10 The NBFU attempted to return to rate control in 1878, 1887 and 1900, but was unsuccessful. 11

During the 1890's, as national anti-trust laws and state insurance regulations brought the once-powerful NBFU under close supervision, the organization began a gradual shift in its focus by formally abandoning its original monopoly-oriented character and employing instead improved methods of reducing the national losses by fire as a more "public-spirited" means of achieving its ends. In a 1900 speech before members of the fire insurance industry, Uberto Crosby noted:

The interest of the fire insurance companies from a purely selfish standpoint lies in the improvement of risks. Profit is made in eliminating the cause of fires, increasing facilities for extinguishing same, and not in advancing rates. 12
The National Fire Protection Association

Perhaps nowhere else is the economic basis of the fire insurance industry's post-1890 shift of emphasis from rate fixing to fire prevention better illustrated than in the creation of the National Fire Protection Association (hereafter NFPA). Formed in Boston in 1896, the NFPA was originally a group of New England stock insurance representatives seeking to draw up standards for sprinkler installations in textile mills. This move was deemed necessary to meet competition from New England "factory mutuals"—associations of mutual fire insurance firms specializing in low-cost coverage of textile mills that had sprung up in revolt against excessive stock insurance premiums during the 1880s. The factory mutuals, incidentally, had pioneered the use of sprinklers in mills, a technological advance directed at avoiding the additional financial burden of stock fire insurance. Also, one of the few founding firms of the NFPA that was not of New England origin was the Western Factory Insurance Association, whose interest lay in adopting the latest sprinkler technology to western canneries and lumber mills.¹³

From this modest beginning the NFPA, working closely with the NBFU, became the public relations arm of the fire insurance industry, working as a "go-between" with industry, state and local governments, and the general public. Technical committees were appointed to deal with questions such as standards for fire hydrants and hose couplings, fire doors and wired glass windows, and automatic sprinkler systems. By 1899, sprinkler standards were the same throughout the United States and Canada, a testament to the work of the NFPA.¹⁴
At a joint annual meeting in 1900, the NBFU voted to adopt and publish the protection standards set forth by the NFPA, a move which officially brought the NFPA under the wing of the largest stock fire insurance interests. During the same year, the need for a testing facility for investigating fire resistant materials and techniques led to a research agreement between the NFPA and Chicago's Underwriter's Bureau of Fire Protection Engineering (later to become Underwriter's Laboratories, better known today as simply UL). This application of the latest scientific techniques in the battle against urban fire was to characterize the NFPA's efforts from 1900 onward.

Origins of a National Building Code

The most visible element of the close relationship of the NBFU and the NFPA in the first decade of this century was their joint effort to create a national scale of city grading standards. In 1902, the NBFU requested the NFPA to appoint a committee to investigate the problem and create such a national scale, an effort which came to fruition in 1905 as the first edition of the Building Code Recommended by the National Board of Fire Underwriters. The purpose of this landmark publication was clearly stated in the Foreword to the original edition:

In the belief that safe and good construction of buildings should be universally recognized as of the utmost importance, this Building Code . . . is based on broad principles which have been sufficiently amplified to provide for varying local conditions . . . . Thousands of human lives and millions of dollars worth of property have been sacrificed by the criminal folly of erecting unsafe or defective buildings. So long as those in authority permit such buildings to be erected, neither life nor property can be safe. A remedy safeguarding both may be found in this book. The vital importance of its principles should arouse municipal authorities everywhere to a realizing sense of their duty and to the grave responsibility
that rests upon them to enact and enforce adequate building laws for the protection of life and property.\textsuperscript{16}

The central feature of the book, copies of which were sent to all U.S. cities with populations of 5000 or more, was a model building code designed for adoption as a "remedial ordinance" (i.e., to apply to buildings erected after adoption) to replace any existing code. Verbatim adoption was a course suggested; the opening sentence, read "The City Council of the City of ...................... do ordain as follows:,"\textsuperscript{17} but for smaller cities there were many sections that were inapplicable. Subjects covered in the code included detailed information on standards for foundations, building materials, roofs, interior openings, standpipes and sprinklers, chimneys and furnaces, means of egress and comparisons of various construction methods. Also included were requirements for specialized buildings such as theatres and other public assembly halls, electrical standards, tenement house laws, and various legal proceedings rising from cases of arson, collapsed or unsafe buildings.

Contemporary with the creation of a recommended building code, the NBFU in 1904 designated a "Committee of Twenty" to perform an in-depth analysis of fifty-five of the largest cities in the United States, and to write a series of fire hazard reports. The primary purpose of these reports was to define the boundaries of the congested value district (CVD) in each city, studying the conflagration danger and preparing an insurance schedule to correspond.\textsuperscript{18}

Among the cities covered by this initial series of investigations were Seattle and Tacoma, reports on which were first produced in 1906. These, as well as subsequent reports that also included Bellingham and Port Townsend, provide what is unquestionably the most precise and unbiased
information on Pacific Northwest urban growth and morphology available for the years before 1920. As will be demonstrated in the following chapters of Part III, it is the existence of these studies which makes possible a more complete understanding of the role of the fire hazard in Pacific Northwest urban morphogenesis.

These reports by the Committee of Twenty were, more often than not, stinging critiques of municipal governments' efforts to confront the urban fire hazard. This was especially true in the West Coast's "cities of kindling," whose predominately frame construction horrified the Eastern inspectors. The October 1905 report on San Francisco, for instance, pointedly observed that the city had "violated all underwriting traditions and precedents by not burning up." The earthquake and fire of the following April levelled four square miles of the business district, caused 700 deaths and over $500,000,000 in property losses. As might be expected, this prophecy, followed by such a disaster, caused widespread interest in the NBFU's report series for other cities, and Seattle and Tacoma, in particular, rushed to make improvements in their plans for fire prevention and control.

**Rating Bureaus**

During the first two decades of the twentieth century, state governments began to play an increasingly larger role in the regulation of the fire insurance business, especially in the area of rate-making. By the end of this study period (1920), most states had established rating bureaus which operated under government supervision. Bureaus were licensed by the state insurance commissioner, and fire insurance companies were bound to
abide by the articles and by-laws of the bureau, as well as to follow the
designated rate structure. The early records of these rating bureaus are
a mine of information for the urban geographer or historian, for the bureaus
were "... required to inspect every risk specifically rated, and to make
a written survey of the risk, which must become a part of the permanent re-
cords of the bureau." 22

In the state of Washington, cities and towns too small to be rated by
the NBFU "Committee of Twenty" series were to be rated by the Office of the
Washington Insurance Surveyor from 1907 to 1910, later known as the Washing-
ton Surveying and Rating Bureau. Bellingham joined Seattle and Tacoma in
1920 as the subject of a major NBFU survey report, but Port Townsend re-
mained under the auspices of the state bureau. It is significant to note
that the format and content of all survey reports were virtually identical,
whether done by the NBFU or the state bureau.

The significance of the rise of state rating bureaus in the thesis study
area will be demonstrated in Part III, for the gradual shift from local to
external control of urban construction was to produce dramatic changes in
the morphology of Seattle, Tacoma and Bellingham (but not Port Townsend)
in the years from 1900 to 1920.

Fire Insurance and Construction Technology

In no other area was the effect of the fire insurance industry on the
morphology of the western city so visible as in that of technological im-
provements in building construction methods and materials. By supporting
research and testing laboratories, both within and outside the insurance
community, the insurance companies were able to encourage more fire-resistant
forms of construction in almost every type of building, from homes to warehouses, offices and factories. The method by which these technological improvements were revealed to builders and insurance surveyors alike was a series of "how-to" books that began around 1900 with such works as Francis C. Moore's *Fire Insurance and How to Build* (1903). Moore's book was the capstone to a long career in the fire insurance business, and explained in everyday language to architects, builders and underwriters the practical aspects of more fire-resistant construction. It also inspired a spate of similar works, among them those of Joseph K. Freitag (1912) and Charles Dominge and Walter Lincoln (1923). A central feature of these "how-to" books was usually a chapter-by-chapter elaboration on recent improvements in the various types of construction, and how they could be improved from a fire risk standpoint. The following is a summary of some of the major changes that would occur in the thesis study area during the period 1900–1920.

Frame Construction

The economic necessity of continuing to rely on wood-frame construction in various parts of the United States, especially the West and South, was recognized by the insurance industry, although this was emphatically discouraged in the CVD. As a result, the insurance interests strongly recommended using the "braced frame" method instead of the heretofore ubiquitous balloon-frame. The differentiating feature between the two was the inclusion of horizontal fire stops between wall studs and, most important, sealing the space between the floor beams and vertical studs in multi-story buildings. Otherwise, the interior of a balloon-frame wall provided a natural flue for fire to rapidly spread from floor to floor.
Another area of concern in wood construction was the use of shingle roofs, especially in the South, Midwest and Far West. While these were effectively outlawed in Pacific Coast CVD's by the early 1900's, their use in residential construction has persisted because the cities in the study area manufactured a substantial percentage of the national shingle supply.

Mill Construction

Mill construction, often referred to as "slow-burning," was long favoured by fire insurance underwriters for factory and warehouse construction. Although these structures were built of combustible materials, the combination of sufficient mass of construction members and readily availability of firefighting appliances--especially sprinklers and standpipes--usually meant that fire could be controlled more easily than in frame buildings. Moore, for instance, recommended that all timbers be not less than 12 inches thick, floor planking to be doubled and waterproof, openings between stories to be sealed, and to allow no concealed spaces to harbour rodents or small, undetectable fires.\(^{26}\)

Mill construction persisted in the Pacific Northwest longer than elsewhere in North America, especially for canneries and lumber mills, as the increasing cost of lumber outside the region made it less competitive with reinforced concrete.\(^{27}\) During the transition from joisted brick to reinforced concrete and steel for commercial construction which occurred between 1900 and 1920, mill construction features were incorporated into what Moore termed "slow-burning store construction,"\(^{28}\) and numerous examples of this still exist in study area CVD's. Although it would be difficult to statistically verify, these buildings have apparently maintained a much better survival rate than their joisted brick counterparts of late nineteenth century vintage.
Steel, Cast Iron and Concrete Construction

It is not surprising that the fire insurance industry was a major backer of the move to commercial buildings of protected iron and steel, and reinforced concrete. Although these types of buildings were much more expensive to erect, their increased height and volume offered more floor space and thus more rental income; their inherent resistance to destruction by fire, on the other hand, meant that both buildings and their contents could be insured for less. Assuming that the builder had the initial amount of capital required, this type of building was therefore a much better investment than its 1890's-era predecessor.

Because of the widespread availability of the necessary natural materials for reinforced concrete construction in the Pacific Northwest, most of the commercial buildings erected before 1920 in the study area used copious amounts of concrete. Thus, the more "airy" appearance of high-rise steel and terra-cotta construction that was prevalent in the East and Midwest was somewhat late arriving in the Puget Sound region.
CHAPTER 8

NOTES


2. Stock insurance differed from mutual in that the pool of capital used to pay losses was controlled by stockholders; mutual insurance was a cooperative where policyholders provided the capital. The latter was very popular in the Far West, particularly for high-risk operations such as sawmills and canneries, because it provided more local control over these critical industries. See "A Comparison of Two Systems," [typewritten manuscript], Unigard Insurance Group Archives.


6. NBFU, Pioneers of Progress, 119.

7. Ibid., 121.

8. Ibid., 122.

9. Ibid., 121; Ketcham, Fire Insurance, 45.


11. NBFU, Pioneers of Progress, 121.


13. Ibid., 2-4.


15. Ibid., 6

16. NFBU, Building Code Recommended by the National Board of Fire Underwriters (New York: NFBU, 1905), foreword [n.p.].

17. Ibid., 7.
18. NBFU, *Pioneers of Progress*, 125.

19. Ibid., 125

20. The destruction of San Francisco is popularly attributed to the early morning earthquake of April 18, 1906, but by far the worst damage was wrought by a three-day conflagration that followed. The start of a number of widely dispersed fires, in conjunction with the rupture of gas and water mains, loss of the electric fire alarm system and debris in the streets completely overwhelmed what was otherwise an excellent and well-equipped fire department. See Morris, *Fires and Firefighters*, 319–337.


25. Moore, *Fire Insurance and How to Build*, 100–105, 482–483. While this concept seems elementary today it is to be remembered that the scientific study of fire and simple thermodynamics was in its infancy in 1903. Also, frame construction had become a deeply rooted folk building form, and carpenters were reluctant to change even such minor details as this.

26. Ibid., 126–129.


CHAPTER 9

SEATTLE

Nineteenth century Seattle had two major morphological phases: the pioneer city of wood-frame stores and houses which was mostly obliterated by the 1889 conflagration, and the post-fire city of brick and stone that went up to replace it during the early 1890's. While some regional urban historians have suggested that postfire Seattle marked the beginning of a new and modern city, the previous examination of the city's experience with fire suggests otherwise. It was not until after 1900 that Seattle, through a combination of technological improvements in commercial architecture and firefighting equipment, in conjunction with deliberate changes in the street grid and urban topography, began to effectively control the urban fire hazard. For ease of organization, this transition has been broken down into three periods, each with its own distinct characteristics.

The Transition Begins: 1901-1905

The City of Seattle entered the present century on the crest of an economic surge that began in the Klondike Gold Rush of 1897-1898, and continued through the First World War. From a population of 42,837 in the post-fire year of 1890, the city had grown to 80,671 in 1900, and to an estimated 160,000 by 1905, making it the largest and most important urban centre in the Pacific Northwest. This period was also one of intense industrial growth: in 1900, the U.S. Census report on manufacturing listed 953 establishments employing 8,500 people and producing $26,373,402 in goods; by 1905 there were over 1400 plants, and production approached $56,000,000. The leading
industries were lumber and shingle mills, shipbuilding, foundries, livestock packing and furniture manufacturing.\textsuperscript{2}

With such a drastic growth rate, the physical appearance of Seattle was changing on an almost daily basis. One of the most visible changes was the improvement of the city's street grid by a combination of paving and topographic regrading. So important was this undertaking that, according to historian James Warren, "The turn of the century serves as the dividing line between Seattle, the western town, and Seattle, the modern city. Until 1900, muddy streets and wooden sidewalks were acceptable, but after that even the planking used on streets in the business district no longer seemed sufficient. Cement replaced wooden sidewalks. Streets which were level or where the grade did not exceed five percent were paved with asphalt laid on concrete."\textsuperscript{3}

But it was the regrading of Seattle's hills that was the city's most momentous achievement, and most of the credit for this earth-moving project was due to Reginald H. Thomson, the City Engineer. Seattle's need for a municipal civil engineer had been apparent for some time but, in 1892, when a new sewer down First Avenue (post-fire Front Street) was found to have been dug uphill, Thomson was appointed to the position. The major regrades were done hydraulically, with the fill being used to create Harbor Island and the port area south of Yesler Way.\textsuperscript{4} A more complete treatment of the regrades is beyond the scope of this discussion, but references to these ongoing projects will be frequent in examining the questions of fire control and business district migration.

The improvements to Seattle's streets were of paramount importance to the fire department. By 1905, the streets in the business district (or "congested value district," as it was called by insurance inspectors) were
82 percent paved, mostly with brick, and 18 percent planked; elsewhere, almost 66 percent of the total street miles was only graded. As a result, the long rainy season and clay soils combined to necessitate long detours by fire department apparatus responding to fires outside the commercial core. 5

Structural Conditions and Hazards

The creation of a city building department was a major advance in the aftermath of the Great Fire of 1889, but during the depression of the mid-1890's its effectiveness was questionable. By 1900, the department had been placed under the City Engineer, R. H. Thomson, who served as superintendent of buildings, bridges and wharves, and inspector of buildings. Under Thomson's leadership, an assistant superintendent and three building inspectors began a regular program of inspecting new construction in the city fire limits, and a system of building permits was created. However, due to the sheer volume of new construction in 1905, the building department was unable to inspect from 150 to 200 structures that were erected in outlying sections--an indication that the office was grossly understaffed. 6

Seattle's first proper building code was a city ordinance passed July 3, 1901 which, in conjunction with the fire limits established in 1889, gave the city its first legal tools in the battle against urban fire. The code also empowered the building inspectors with authority to enforce the various requirements of the code in cases of new buildings or those being remodeled. Some of the highlights of the 1901 code, from the standpoint of structural urban morphology, were:

1) Fireproof Construction: required of all buildings in fire zone 85 feet or more in height, except grain elevators and mill constructed buildings.
2) Mill Construction: standard floor thicknesses and beam sizes specified for buildings used as warehouses or workshops.
3) Frame Construction: not allowed within fire limits; existing frame buildings must be removed when damaged more than 40%.

4) Building Heights:
   a) frame buildings (in second district): 36'.
   b) frame buildings (in fire district): 3 stories.
   c) frame buildings (outside restricted area): 50'.
   d) joisted (brick) buildings: 84'.
   e) mill buildings: 102'.
   f) fireproof buildings: 120'.
   g) fireproof w/steel frame: 200'.

5) Floor Openings: permitted in all buildings; required protection only in fireproof and mill buildings.

6) Standpipes: required on all buildings four or more stories in height; interior standpipes and hoses required only in theatres.

7) Sprinklers: required only at stage end of theatres.

8) Fire escapes: required on all buildings three or more stories in height.

9) Fire Limits: established the entire commercial and industrial portion of the city as the first building district; the second building district was a one to four-block "buffer zone" on all sides of the first district.  

The content of the 1901 building code is significant to the urban geographer for two diametrically opposed reasons: first, it gave the city government for the first time the power to define legally the structural morphology of the city; and, second, it was grossly inadequate, for it did not address the chief fire dangers in the city. With regard to the latter point, a 1905 inspection of Seattle by the National Board of Fire Underwriter's (NFBU) evaluation team observed: "The present building laws are wholly inadequate ... and omit practically all the important features necessary for fire protection." Areas singled out were the failure to provide limitations on floor areas and lack of protection for exposed openings (especially windows), communications between buildings and openings in floors for elevators and stairways.  

The shortcomings in Seattle's building code, when taken together with other weak areas of urban regulation--inadequate regulations for the handling and storage of explosives and inflammables, and a total lack of laws
FIGURE 54: A typical post-fire Seattle Block, First Avenue between Seneca and University, was all joisted brick hotels in 1901. (University of Washington Library, Photograph Collection.)

FIGURE 55: The immensity of the regrading of Seattle in the early 1900's is depicted in this view of the area between Denny Way and Queen Anne Hill. (University of Washington Library, Photograph Collection.)
on electrical installations—resulted in what the Boston-based NBFU inspectors considered a serious conflagration hazard in the congested value district (CVD). As a result, once again the myth of a fireproof city arising from the ashes of sixteen years before must be questioned.

As can be seen on the map of Seattle's 1906 CVD (Map 9), the area consisted of a narrow strip of forty-six blocks lying parallel to the waterfront. However, the map does not show the steepness of the slope, extending from sea level on the west to 125 feet at Fourth and Union Streets, with some east-west street grades reaching 25 percent. As a result, a number of buildings overhung their exposures across the narrow streets and alleys. Although most of these buildings were of 1890's vintage brick construction and were only two or three stories in height, they often contained highly inflammable merchandise, were too close together, were full of exposed openings across narrow alleys, and contained large internal areas undivided by fire walls. Of the seven blocks depicted as especially bad risks, note that seven are in the Pioneer Square area rebuilt after 1889 of "fireproof" brick and stone!

The relative condition of the commercial CVD in 1905 stood in contrast to the wharf and warehouse district on the waterfront. While this area was a fire hazard from the standpoint of being all frame construction, with large interior areas, built on pilings, with few fire mains or hydrants and often isolated by train traffic from fire apparatus on the CVD side of the tracks, these negative factors were mitigated by relatively low building heights, easy fireboat access and considerable private protection, including standpipes, hoses, and constant watchmen. The same situation applied to the manufacturing area that had arisen on the filled tideflats south of the commercial district. Here were shipyards, sawmills, canneries, grain
MAP 9: CONGESTED VALUE DISTRICT, 1906.
(Washington Survey and Rating Bureau.)
elevators and machine shops, none of which were considered conflagration risks because of their wide spacing and internal fire protection systems, including sprinkler systems, standpipes and around-the-clock security.  

Water Supply

While the relationship between a city's water supply and its pattern of urban growth may seem at first tenuous--save perhaps for cities in very arid climates--there is ample reason to believe, based on the amount of attention given to the subject in fire insurance surveys, that even in a well-watered environment such as the Pacific Northwest coast its presence and capabilities were instrumental in both building and protecting the city. This was especially true in Seattle where, despite the waterfront location and relatively well-equipped fire department, the entire heart of the city had once been lost due to an inadequate supply of water at a critical point.

As noted in an earlier chapter, the depression of the mid-1890's delayed the improvement of Seattle's water system until the turn of the century. The completion of the Cedar River conduit and associated reservoirs in 1901 assured Seattle of an adequate water supply for what was then the foreseeable future, and for the rest of the decade minor improvements were made to the system. Providing water to the upper reaches of the city's hills proved to be a demanding task, and was accomplished during this period by building a series of reservoirs at Green Lake, Volunteer Park and Queen Anne Hill. These were supplied by a series of steam-powered pumping stations. In the event of a failure in the main conduit from Cedar River, an auxiliary station at Lake Washington was capable of providing essential service until normal operations could be restored.
By 1905, the water mains of Seattle serviced 1,790 fire hydrants, most from six-inch cast-iron feeder pipes off the water mains. In the residential areas, hydrants were located at the corner of each block (approximately 320 feet apart); in the downtown area, spacing was much closer (usually 160 feet or less), and in certain high-risk localities the fire chief would recommend additional hydrants. Cooperation between the fire and water departments was generally excellent and most of the fire chief's recommendations were accepted: for example, all of Seattle's hydrants were of the latest (and most expensive) design, with the normal outlets for two standard fire hoses, plus a four-inch steamer outlet for the fire engine. In spite of the quality of the hydrants, however, the 1906 fire underwriters' report noted that these were not inspected and tested for pressure at regular intervals.\footnote{11}

Fire Department

The Seattle Fire Department had become a full-paid (rather than volunteer) department in the aftermath of the 1889 conflagration. Under the leadership of a fire chief who was a political appointment of the mayor, the department was operationally independent of city government, but its activities were subject to "general oversight" by both the mayor and the civil service commission. The city was divided into two fire districts, each under an assistant chief. One was the area south and east of Lake Union, the other that area south and west of Lake Union; both assistant chiefs responded to fires in and near the CVD.

By 1905, the Seattle Fire Department had a total membership of 139 men, of whom 130 were actually firefighters. Salaries for the firefighters constituted the lion's share of the department's expenses in the early years.
of this century, although expenditures for new equipment were also substantial. These expenses, when compared to Seattle's population for this period, tended to average about $1.00 per person per year.\textsuperscript{12}

All appointments and promotions were the responsibility of the fire chief, who selected applicants from lists provided by the civil service commission. This resulted in a fair and equitable system of promotions, with a well-defined career ladder for all firemen except engineers, who were often chosen from outside the department due to a continual shortage of trained labour in this field. There was also an adequate, if not generous, retirement and pension system, and disabilities or injuries were covered by a dues-supported S.F.D. Relief Association.

The Seattle Fire Department was organized into 21 companies of various types: eight engine, one fireboat, six hose, three ladder, two chemical and one water tower. The five most central engine and ladder companies were stationed around the boundaries of the CVD, leaving only the fireboat in the centre of this district. This was largely due to the steepness of the grades of east-west streets, so the heavy steamers could make either level or downhill responses to CVD alarms. Similarly, in residential sections fire companies were also stationed on hilltops or ridges; these companies were also equipped with lighter and more maneuverable chemical engines or hose wagons rather than steamers\textsuperscript{13} (see Map 10).

These units were housed in sixteen firehouses about the city. All were architecturally distinct two-story buildings and contained a garage area for engines and wagons, repair shops, stables for the horses, upper floor living quarters, and a distinctive tower for drying hoses after a fire. All stations were equipped with an overhead harness system that dropped into place when the trained horses were in their proper position in front of
MAP 10: FIRE MAP OF SEATTLE, 1906
Building zones, fire department distribution and the water system are all depicted in this map which accompanied the 1906 NBFU report. (Washington Survey and Rating Bureau.)
the engine or wagon (Figure 56), and engines were connected to the fire-house heating system to keep hot water in the boilers.\textsuperscript{14}

In addition to its obvious responsibility of fighting fires in the city, the Seattle Fire Department was also responsible for several auxiliary functions, including the fire alarm system and the office of fire marshal. A new twelve-circuit Gamewell telegraphic alarm replaced the old 1889 system in 1905. A system of 143 call boxes was dispersed throughout the city, and connected to an alarm headquarters office at Columbia and Seventh. This office was, in turn, linked to other firehouses via a separate telephone exchange. As a result of this alarm system, the department's response time to a fire alarm was greatly reduced.\textsuperscript{15}

The office of Fire Marshal, established in 1901 to investigate the causes of fires of unknown origin, was first held by ex-chief Gardiner Kellogg. Inspection of all buildings and enforcement of the building code were also among Kellogg's responsibilities, and he was required to make monthly reports to the city council. As Kellogg managed to make only five arrests for arson between 1903 and 1905, and secured no convictions, it was thought in insurance circles that the job required the services of a younger and better-trained investigator than the old chief.\textsuperscript{16}

The Seattle Fire Hazard in 1905

As the preceding description suggests, Seattle in 1905 was in the middle of a period of tremendous population growth and building expansion, a true urban metamorphosis from a western railroad town to a regional metropolis. Attendant to this period of rapid growth was a greatly increased danger of fire, a situation similar to earlier periods in the city's history. In spite of the quantum leaps in firefighting technology, water
FIGURE 56: Dropping the ceiling-suspended team hitch onto the waiting horses. This scene was posed by a commercial photographer at Seattle's Engine Company #6 in 1916. (University of Washington Library, Photograph Collection.)
systems and building technology, the first report on the city by the NBFU, written in 1906, pointed out glaring deficiencies in Seattle's ability to prevent and suppress urban fire. It is to be remembered that the inspector's who compiled this report were associated with large Eastern fire insurance firms with capital at risk in Seattle. For the most part they were judging the city in comparison with Boston, New York and Philadelphia, cities which had long since passed through the dangerous evolutionary period in which Seattle found itself.

In the general summary to the 1906 report, the inspectors found Seattle's greatest potential danger to be that of conflagration in the CVD—a situation unchanged from the late 1880's. The large number of overhanging structures on the steep slopes of downtown had largely negated the value of the 1889 street-widening effort; also, too many of the post-fire office and commercial blocks were too compact, structurally weak, and contained too many "large area" (undivided) spaces. Also contributing to the severe risk were the presence of "conflagration breeders"—high-risk older structures—scattered among the better ones, the "undesirable grouping of weak blocks, scant private protection and a lack of reserve strength in the fire department."17

As a result of this largely unfavourable situation, Seattle's merchants would be forced to pay much higher premiums to insure their buildings and blocks against fire by the Eastern companies who based their rates on these reports. In the years after the 1906 survey, the effect of these recommendations was to be apparent in every aspect of urban fire prevention and suppression.
The Concrete Revolution

Seattle's serious fire hazard during the years following the turn of the century was, as has been suggested, a result of the combination of post-fire building practice and the rapid growth of the city's population. The extent of this population growth is shown in Table 3, which is a listing of the number and value of wood-frame buildings—most of which were residences—that were erected between 1893 and 1903. Because this "... inpouring of homeseekers and investors proved too much for the city proper to handle," residential growth was mainly in peripheral suburban areas to the north and south.

The question of dealing with the business district fire hazard during this period of rapid growth was one which provoked lively debate among architects, engineers and builders during the early years of this century. Much of this debate appeared in the pages of the Pacific Record (later Pacific Builders' and Engineers' Record), a professional journal begun in 1904, and involved the relative merits of concrete as a medium for creating a truly fireproof (or fire resistant, as it was more accurately coming to be called) commercial building technology. Concrete supporters were given a tremendous boost by a major conflagration in Baltimore in 1902, in which a business district of brick and stone joisted construction very similar to Seattle's was gutted by a fire whose temperatures reached 2500°F. This firestorm blew out unprotected windows, negated streets as fire barriers and crumbled granite foundations.18

In an eerily prophetic 1904 article, Fire Chief Sullivan of San Francisco observed: "When one sees what may happen in a city such as Baltimore, made as it is of brick and stone, only the imagination can conjecture what
## TABLE 3

**FRAME BUILDING CONSTRUCTION**

**SEATTLE, 1893-1903**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Structures</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1893</td>
<td>1335</td>
<td>$1.1 million</td>
</tr>
<tr>
<td>1894</td>
<td>713</td>
<td>.46 &quot;</td>
</tr>
<tr>
<td>1895</td>
<td>670</td>
<td>.28 &quot;</td>
</tr>
<tr>
<td>1896</td>
<td>586</td>
<td>.20 &quot;</td>
</tr>
<tr>
<td>1897</td>
<td>616</td>
<td>.36 &quot;</td>
</tr>
<tr>
<td>1898</td>
<td>1197</td>
<td>.97 &quot;</td>
</tr>
<tr>
<td>1899</td>
<td>2012</td>
<td>1.57 &quot;</td>
</tr>
<tr>
<td>1900</td>
<td>2960</td>
<td>3.26 &quot;</td>
</tr>
<tr>
<td>1901</td>
<td>5869</td>
<td>4.57 &quot;</td>
</tr>
<tr>
<td>1902</td>
<td>6384</td>
<td>6.33 &quot;</td>
</tr>
<tr>
<td>1903</td>
<td>6914</td>
<td>6.50 &quot;</td>
</tr>
</tbody>
</table>

*SOURCE: Pacific Record, Feb. 6, 1904.*
would be the fate of San Francisco, with her thousands of wood-frame buildings." Sullivan also noted the isolation of San Francisco as being a consideration in case of a major conflagration, a situation quite different from Eastern cities. 19

The obvious similarities of the fire hazard in San Francisco and the Puget Sound cities was not lost on local builders and, in May 1924, Pacific Record devoted an entire issue to the improvements that concrete and steel construction offered for improved fire protection. The basic technology for commercial construction utilizing steel skeletons and curtain walls of non-bearing masonry or concrete had been perfected in cities such as New York, Boston and Chicago during the late 1800's, but for economic reasons--more floor area per land parcel, for instance--rather than fire safety. In the Pacific Northwest, where urban land values were much lower, concrete was adopted as an inexpensive and more fire-resistant substitute for traditional masonry. 20

The earliest concrete in Puget Sound cities had come from either England, in the holds of grain ships as ballast, or the Orient--especially Hong Kong, Macao and Japan. In Seattle, its earliest use was in paving streets and sidewalks during the late 1890's; by 1900, it had become popular for foundations and basements. Seattle's first concrete-foundationed commercial block, the 1900 Miles and Piper Building on First Avenue, proved to Architect Max Ubrecht that he had found an ideal medium for the Pacific Northwest's mild, damp climate. By the time the building boom of 1903 was underway, Seattle and Tacoma were the largest importers of Oriental concrete on the West Coast (except for San Francisco), and by 1904 had developed the necessary ingredients--cement, sand, lime and gravel--in the region, and inexpensive water transportation to move them. Architects'
testimonials during this period invariably showed concrete's fire resistance as a major reason for its use, as well as its superior resistance to water, and its lower cost than traditional brickwork.21

It would be a mistake, however, to assume that commercial building in concrete on Puget Sound was merely part of a national (or continental) trend. Many western cities resisted the move to concrete. In Denver, where building stone was both available and popular, it was rare until the 1920's; in Western Canada, where British-trained architects held anything but stone in contempt, its use was similarly delayed. In a letter to the editor of the Pacific Record, Vancouver architect T. E. Julian stated: "Concrete can never be used as a first-class building material where skilled and artistic labour is needed," and suggested that buildings erected by "day labourers" in concrete would never compare to those built by "skilled artisans."22

In March, 1905, the Pacific Record reported that experiments with manufacturing Portland cement in Washington with local materials had been successful, and that the Washington Portland Cement Company of Seattle was building a plant at "Cement City" on the Skagit River. The article speculated that Washington could become an exporter of cement in a few years, a prophecy which was to be fulfilled. Perhaps to prevent any architect or builder from missing the point, the same page contained a note that a prominent Baltimore architect had just designed a building of all-iron-and-cement construction—a blunt hint that the answer to the Northwest's conflagration problem was at hand.23

The desire for lower fire insurance rates was brought up in almost every article on new types of concrete building technology. A story on hollow concrete blocks in May, 1905 suggested that, while "favorable insurance rates" have been hard to procure in the West, eastern building
owners have been getting "exceedingly low rates" (3.75 percent to 7.5 percent) with this type of construction. The article went on to suggest that western insurance companies should be "invited" to test these buildings in order to reduce the obstacles in the way of potential manufacturers of this type of block. Within a few years, firms producing artificial blocks of pressed concrete could be found in every major town in the region.\(^2\)\(^4\)

Seattle's rush to build fire resistant buildings during this period was punctuated by a few glaring mishaps which pointed up the dangers of moving into a new type of construction technology with minimal preparation. The best example of these was the 1905 "Lowman Building Accident," which exposed a number of shortcuts that were being taken by local contractors. The Lowman Building was being erected using the "Clinton System" of concrete floors laid over wire mesh. The wire mesh had been laid down on a wood false floor, then concrete was poured. Because of the initial lack of adhesion between the concrete and the structural mesh, when the sixth floor was poured and one of the false floor supports gave way, five floors of "green concrete" fell onto one another and thence to the basement. Only two workers were injured in this spectacular collapse, but the potential for future calamities of this type was realized, and the process of concrete pouring became more closely scrutinized by both the building inspector and the insurance company representatives.\(^2\)\(^5\)

**The Fire Hazard Controlled, 1906-1910**

Seattle's drive to control the urban fire hazard during the first decade of this century was occasioned by the largely unfavourable report on the city in the 1906 NBFU evaluation. A subsequent report written in 1910 illustrates the tremendous changes in the city's morphology during the last
half of the decade, most of which were occasioned by the need to reduce high fire insurance rates in the business district.

During 1909, the year the inspection party recorded its observations, the population of Seattle had increased to 284,000 (as compared to 80,571 in 1900), largely as a result of the Alaska and forest industries booms and the annexation of the city of Ballard and a number of smaller suburbs. The area of the city had increased to 84 square miles in 190026 (Map 11).

The regrading of the downtown streets had markedly improved the street grid from the fire hazard perspective: north-south streets were all of five percent grade or less, and the east-west streets--some of which had grades of 25 percent in 1904--had been similarly improved, although the worst grades still exceeded 14 percent and made access by fire apparatus difficult. Virtually all of the business district streets were paved and in good condition, but unpaved streets and steep grades would remain a problem in the outer suburbs until the 1920's.27

Structural Conditions and Hazards

The years between 1906 and 1910 witnessed a notable change in the degree of control over building construction in the city of Seattle, especially within the designated fire limits. A 1908 revision of the city charter removed the responsibility of building inspection from the city engineer's office and created a separate building department. This move was supported by the local chapter of the American Institute of Architects, who had gone to Mayor Ballinger in January, 1906, to persuade him to get someone with "building expertise" into the position of building inspector; this concern was apparently triggered by the apparent indifference of R. C. Thomson to architectural matters (although in all fairness his preoccupation with
MAP 11: ANNEXATIONS TO THE CITY OF SEATTLE TO 1910
(University of Washington Library, Photograph Collection.)
The office of building inspector was to be filled by a civil engineer, architect or builder, for a term of three years, and was a political appointment by the mayor. The primary responsibility of the building inspector was ensuring that all new construction was in conformance with city building codes. His efforts were complemented by those of the fire marshall, who was concerned with fire prevention measures in existing buildings, especially the congested value district. Insurance companies were represented by the Fire Underwriters Inspection Bureau who, from 1904 onward inspected the business district and outlying major public buildings, and made "recommendations" to owners and tenants concerning possible fire hazards. The state of Washington was represented by the office of the Washington Insurance Surveyor, who inspected all new buildings and changes of occupancy or material alterations to older ones, and served as a contact point for architects and builders on the latest methods of fire prevention, construction and equipment. In 1909, a state hotel inspector was appointed to specialize in fire hazards related to their construction and operation, especially the use of fire escapes.

On October 26, 1907, Seattle adopted a new building code which was specifically designed to correct the weaknesses in the previous code. The new code provided for a system of building permits, regular building inspections, the keeping of records and what the Boston fire underwriters termed a "mainly excellent" set of building regulations for new construction. The following is a summary of the main features of the code as they related to urban morphology and fire prevention:
--Building Districts: the city was divided into three building districts (see Map 12), a central business district in which only Class A fireproof construction was permitted; a second district surrounding the first in which all frame construction was prohibited except on pilings over the water; and a third district comprising the rest of the city, in which all classes of building were permitted.

--Construction Classes: all buildings in the city were classified according to a fire-risk scale which restricted their location:

Class A (Fireproof): must have floors and roof of brick, terra-cotta or reinforced concrete; if more than 8 stories, a steel or reinforced concrete frame; no woodwork in halls or stairways; specifications for mixing and pouring concrete; all public buildings of 3 stories or more to be of Class A construction.

Class B (Protected Joisted): exterior walls to be of masonry, steel and iron framing optional; all metal structural members to be fireproofed with concrete or terra-cotta; floors and roofs of wood permitted; all interior walls to be plastered; no wood in halls or stairways.

Class C (Semi-Mill): As Class B, except unprotected metal structural members permitted; wood structural members to be 10" or greater in least dimension.

Class D (Joisted): Exterior walls of masonry; floors of double thickness (minimum); ceiling and interior walls of halls and stairways of metal lath with hard plaster.

Class E (Frame): if non-residential and two or more stories in height, must have interior walls of "incombustible stud" construction (metal lath with hard plaster).

--Building Heights: limited according to class of construction:
A=200'; B=100'; C=80'; D=60'; E=40'.

--Floor Areas: limited according to class of construction and location on block:
A=20,000 sq. ft. (corner), 18,000 sq. ft. (interior)
B and C=15,000 (corner), 9000 (interior)
E=8000 (corner), 7200 (interior).

A number of other requirements also appeared, including those involving roof and window openings, chimneys, elevator shafts, fire escapes and furnaces. Automatic sprinklers were required in theatres and recommended for warehouses; standpipes with standard fittings were required in all
warehouses, public buildings and commercial buildings of four or more stories. It is noteworthy that the only part of this otherwise ideal building code that pertained to residential construction was that all classes of buildings were required to have fire stops (horizontal members between studs) in walls and partitions--the building of houses remained virtually unregulated.\textsuperscript{31}

The NBFU concluded its review of Seattle's structural conditions by observing: "The enactment of a comprehensive building code and the establishment of fireproof limits and of extensive fire limits show that Seattle appreciates to a degree equalled by few American cities the importance of safeguarding the heart of the city against destruction by conflagration."\textsuperscript{32} That such a positive report could be written only five years after the city was described as a conflagration waiting to happen is indicative of the rapid change in Seattle's morphological evolution. It is instructive to note that the only part of the city that was considered to have any conflagration potential at all was the newly-annexed Ballard area, whose waterfront mills and frame construction represented the same stage of morphological evolution as Seattle in the 1880's.\textsuperscript{33}

Fire Department

In the aftermath of the NBFU's stinging report of 1906, the city of Seattle began to lavish funds on its fire department. Per capita expenditures, based on a population of almost 250,000, rose from $1.03 in 1904 to $1.14 in 1908; total expenditures rose from $217,707 in 1906 to $283,500 in 1908. This figure included $175,000 for real estate and new fire stations, and $125,000 for a new fireboat.\textsuperscript{34}
The size of the department increased as well, with a total membership of 226 by 1909, of which 216 were the actual fire force, the remainder clerical staff. A comparison of staffing in 1906 and 1909 is given in Table 3; this does not include 31 substitute, or reserve, firefighters, nor does it include 91 members of suburban volunteer companies outside the incorporated areas.

By 1909, the Seattle Fire Department had grown to twelve engine companies (including one assigned to the fireboat), eleven hose, five ladder, one water tower and two chemical companies. Equally important was the improved distribution of these companies: there was now an engine or hose company within 1500 feet of every building in the CVD, and at least four engine, one chemical, one hose and two ladder companies within one mile of every point in this district (Map 12). The combination of fire company distribution, improved street grades and pavements, alarm systems, quick firehouse response—notably due to drop harnesses and pre-fired boilers—and the mobility of the fireboat, resulted in a dramatic improvement in the department's ability to contain a fire to the building of origin. Also created was a preplanned alarm response system for each type of fire company in any one of three fire levels (denoted as one-, two- or three-alarm fires).35

While it is not immediately apparent from the foregoing, the increase in engine capability during this period was considered to be the most significant improvement by the NBFU, and "should be adequate for many years." Six new steam pumpers had been added since 1906, and the improvement of the fireboat capability was also dramatic. The old SNOQUALMIE, put into service on the waterfront in 1890, was literally rotting away. Her replacement, the steel-hulled DUWAMISH, was designed from the keel up as
TABLE 4

SEATTLE FIRE DEPARTMENT STAFFING COMPARISON

<table>
<thead>
<tr>
<th>Fire Force</th>
<th>1909</th>
<th>1906</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ass't. Chiefs</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Captains</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>Lieutenants</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>Marine Engineers</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Steamer Engineers</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Pilots</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Stokers</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Drivers, Horsemen</td>
<td>128</td>
<td>72</td>
</tr>
<tr>
<td>Laddermen</td>
<td>216</td>
<td>130</td>
</tr>
</tbody>
</table>

MAP 12: FIRE MAP OF DOWNTOWN SEATTLE, 1910
Area within black dots is First Building District, within open dots is Second Building District. (Washington Survey and Rating Bureau.)
a fireboat and had a 9000-gallon rated capacity. The 6000-gallon capacity SNOQUALMIE later had her hull rebuilt, and served on the waterfront until 1927, when she was moved to Lake Union.\textsuperscript{36}

The department's ability to answer fire alarms quickly was greatly enhanced by the increase in call boxes on the Gamewell Telegraphic Alarm system. The 265 boxes in the system in 1909 included those from the original 1898 system, all of which were periodically refurbished and regularly tested. The distribution of these boxes was considered good in the central part of the city but, as might be expected, too few and far between in the rapidly expanding outer residential areas. Alarm service was augmented by the two local telephone exchanges, which had 46,200 subscribers by 1909.\textsuperscript{37}

\textbf{Seattle in 1920}

By the end of the First World War, Seattle was not only the largest city on Puget Sound, but the leading metropolis of the entire Pacific Northwest. From a 1910 census population of 237,194, the city had reached a figure of 315,562 a decade later. Most of the growth was attributable to greatly expanded trade with Alaska and the Orient, made possible by six major railroads and a number of shipping lines serving the port. Major industries included not only the traditional forest product mills and canneries, but shipyards, machine shops and foundries. Also, Seattle was becoming a major financial centre, especially for regional natural resource investment and development schemes.\textsuperscript{38}

Seattle's quest for protecting the central business district from the fire hazard continued unabated through the decade between 1910 and 1920. From a fire prevention standpoint, the most instrumental means was the
July 22, 1913 passage of an improved building code for the entire city. While based on earlier codes, the new law was much stricter, and ultimately more effective. Among its most important provisions were those for four building districts in which building construction and usage were much more tightly controlled:

---Building District #1: made up of 58 blocks of the CVD and 9 blocks outside, the only buildings permitted were of fireproof construction (protected steel and/or concrete) or mill construction if less than two stories.

---Building District #2: permitted were fireproof, mill, one story joisted brick business buildings and two story joisted brick apartments; this district included and surrounded the rest of the CVD.

---Building District #3: permitted were one story frame business blocks and two story frame dwellings; this district surrounded the second district, and also included the minor mercantile centers of Ballard and the University district.

---Building District #4: the balance of the city; frame construction was permitted. In addition, automatic sprinklers were required in all non-fireproof buildings in the CVD, as well as certain other buildings of prescribed height and occupancy. Improved specifications for fireproof construction, protection of windows, skylights and floor openings, and roof coverings were also included, and all buildings over two stories (in any district) were required to have a "stair and balcony" type fire escape.

Despite these precautions, some older portions of the CVD were still deemed to be a possible conflagration hazard. These "bad blocks" are depicted on Map 13; note that these are essentially the same as they appeared in 1905, carryovers from the masonry resurrection of 1889-1890. In examining these blocks, the 1920 NBFU report recalls many of the same criticisms of these buildings that first surfaced in the 1890's: too many "inferior buildings" grouped together, streets and alleys too narrow for
(Washington Survey and Rating Bureau.)
effective firebreaks and steep grades increasing building exposures. This report went on to note that the hazard was somewhat ameliorated by recent improvements. While serious fires were a "probability" in this area, improvements in the water supply system and the greatly increased efficiency of the fire department meant that a conflagration probably would not occur except "under a combination of abnormal conditions." Also, it was suggested that with the inclusion of the automatic sprinkler law, the combination of fireproof and sprinklered buildings in this district could "create valuable barriers against the spread of fire." As a result, "while severe individual to block fires are probable, which in some instances might spread across narrow streets, no fire should involve any considerable portion of the district." Equally dramatic were Seattle's efforts to improve its urban fire suppression capabilities during this decade. By 1920, the number of firemen had increased to 556 from 247 in 1909. The liberal amounts of money directed at improving the fire department resulted in a per capita expense of $3.64 for 1920, as opposed to $1.14 in 1908. The Seattle Fire Department had gone to a two-platoon system in 1913, resulting in continuous manning of all fire stations. The platoons worked ten-hour day shifts and fourteen-hour night shifts, and traded each month. All firemen were required to have home telephones and off-duty platoon members were required to respond to second alarms. The amount and types of new firefighting apparatus purchased by Seattle since 1910 illustrated the technological revolution brought about by motorization. With twelve automobile fire engines, six auto hose wagons and five ladder trucks, the department was finally freed of much of the burden attendant on relying on horses to move equipment through city streets. The
result was faster responses to alarms and more flexibility in locating
fire stations, especially in outlying areas.\textsuperscript{44}

With increased personnel and more equipment, the Seattle fire depart-
ment was able to field twenty-one engine companies, thirteen hose companies,
one chemical company, ten ladder companies, one squad company, one water
tower company, and two fireboats. Note the concentration of engine com-
panies in the CVD (Map 13), where their pumping capabilities were required
to deal with large fires in multi-story buildings; they were assisted by
the aerial ladder companies and the water tower company. The lighter hose
companies were deployed outside the high value district, primarily in
residential areas.

The waterfront conflagration hazard made the acquisition of a second
fireboat a necessity, as recounted earlier. After the new DUWAMISH went
into service in 1909, SNOQUALMIE was resurrected by major hull repairs and
conversion from steam to oil-fired propulsion, and returned to full service
in 1911. This move was made necessary by the rapidly increasing spread of
new waterfront piers and warehouses, a process which began in the years
before the 1914 opening of the Panama Canal, and continued unabated through
the grain-shipping and shipbuilding expansion of the First World War.\textsuperscript{45}

As a result of these improvements, Seattle in 1920 was protected by
a strong, well-equipped and efficient fire department. Such a department
was essential, according to the conclusion of the NBFU evaluation because,
in spite of the excellence of Seattle's new building laws, there were still
some dangerously weak areas. Specifically noted were the unrestricted use
of wooden shingled roofs outside the fire limits, and "predominately weak"
construction in the older portion of the business district. Twenty years
into the present century, Seattle was still haunted by its "city of kindling" image in Eastern eyes. 46

Conclusions

Seattle's efforts to deal with the urban fire hazard in the early twentieth century were remarkable, not only for their expense and the intensity with which they were carried out, but also for the almost total lack of attention that urban historians have paid to their role in creating the modern city. In this brief summary, we will review the effect of Seattle's attempts to deal with both the prevention and suppression of urban fires. It was in the area of fire prevention that the morphological structure of Seattle was most obviously affected during this period, and elements of all three of the primary components of this morphology--street patterns, land use and building technology--reflect the influence of planning for fire prevention.

When we consider the idea of changing a city's street pattern, there is a natural tendency to think of the process in terms of only two dimensions, as with the post-fire street widening in 1889. But the extensive regrading program undertaken by Seattle after 1900, although it was done for reasons other than fire protection (most often for improved commercial access, with filling the tideflats a secondary reason), it served to enhance fire suppression to a point where it certainly could be described as conflagration prevention. This was also aided by the paving of city streets, first with expensive bricks and later with concrete, the latter as much a cheap natural building medium as cedar planks had been two decades before.
Fire protection was even more obvious in the increasingly strict building codes and land use laws between 1901 and 1920, and these in turn stand in stark contrast to the almost total lack of land use controls before 1889. The end of a period when an individual home or store builder could build where and how he pleased marked a jarring transition in American urban evolution, especially on the Pacific Northwest frontier, where the change occurred in less than three decades.

The most clearly-defined efforts to prevent urban fire were in the regulation of building materials and techniques. This is best represented by the transition to metal-framed, multi-story buildings of reinforced concrete and terra-cotta. These buildings were constructed using the latest technology, and were in conformance with the various revisions of the Seattle building code for "fireproof" structures. Probably the two best examples of this type of building are the 1904 Alaska Building and the 1914 Smith Tower.

The Alaska building was the first steel-framed building in the Pacific Northwest and, at fourteen stories, it was for a decade the tallest building in Seattle. Erected by the Scandinavian-American Bank as a combination bank and office block, the Alaska Building was such a financial success that it spawned a host of similar buildings. Most important, however, was the fact that, in order to escape the "conflagration breeders" in the Pioneer Square area, these new buildings were erected to the north along First, Second and, later, Third and Fourth Avenues. Thus, a combination of re-grading, streetcar access and fear of exposure to fire caused the business district of Seattle to migrate from its original Yesler Way origin—exactly as the fire underwriters had predicted that it must.
FIGURE 57: Detail from 1916 insurance plan showing new "fire-proof" steel, concrete and terra-cotta buildings (orange) appearing north of Yesler Way: Hoge Building (A), Alaska Building (B) and Smith Tower (C). (University of Washington Library, Northwest Collection.)

FIGURE 58: Three generations of Seattle building technology are represented in this 1914 view of the wood-frame waterfront, brick commercial district and the new Hoge (A), Alaska (B) and Smith Tower (C) buildings. (University of Washington Library, Photograph Collection.)
FIGURE 59: The Smith Tower under construction, 1914, showing technological link of skeleton/skin systems of balloon framing and steel/concrete construction. (University of Washington Library, Photograph Collection.)
In a bid to anchor the downtown to the older city centre, typewriter magnate Lyman C. Smith, in 1914, erected the Smith Tower, a 42-story, 600-office building with a steel skeleton and terra-cotta "skin," for decades the tallest building west of the Mississippi River. Both buildings, and those that followed them, were as well-designed from the fire hazard standpoint as any in North America, and mark the emergence of Seattle as a national as well as regional metropolis.

A final point to be made here is that, in spite of Seattle's attempts to control the urban fire hazard by the regulation and/or improvement of buildings, streets and land use laws, certain parts of the city remained conflagration hazards even beyond 1920. In order to deal with the continuing problem of older, fire-prone buildings intermixed with newer, more fire-resistant ones, it was necessary to invest large sums of municipal money into fire suppression. Only by ensuring a rapid and adequate response to a building fire--in order to suppress it in the structure of origin--could the Seattle Fire Department hope to prevent a disaster such as that of 1889, or perhaps even more relevant in this case, that of San Francisco in 1906.
CHAPTER 9

NOTES

1. Morgan, Skid Road, 159-168; Sale, Seattle: Past to Present, 94-135.


4. Sale, Seattle: Past to Present, 72-78.


6. Ibid., 31.

7. Ibid., 31-32.

8. Ibid., 33.


10. Ibid., 6-12.

11. Ibid., 14.

12. Ibid., 17.

13. Ibid., 18-23.


16. Ibid., 29-30.

17. Ibid., 45.

18. Pacific Record, February 16, 1904, 1.

19. Ibid., April 2, 1904, 3.

20. Ibid., May 28, 1909, 2.
22. Ibid., 8.
23. Ibid., March 11, 1905, 3.
24. Ibid., May 27, 1905, 3.
25. Ibid., November 4, 1905, 3.
27. Ibid., 2.
28. Ibid., 33; *Pacific Building and Engineer's Record*, Jan. 20, 1906, 3.
30. Ibid., 34-38.
31. Ibid., 38.
32. Ibid., 39.
33. Ibid., 46.
34. Ibid., 16.
35. Ibid., 27.
39. Ibid., 29-30.
40. Ibid., 30.
41. Ibid., 35.
42. Ibid., 38.
43. Ibid., 14.
44. Ibid., 15.

46. Ibid., 43.

47. Seattle Post-Intelligencer, "Alaska Building was once Seattle's Tallest," July 24, 1985, C-2.

48. Dorpat, Seattle: Then and Now, #109. (n.p.)
The relationship of a serious urban fire hazard and periods of rapid urban expansion is a direct one, and has been well-illustrated by the case of Seattle in the years after the turn of the century. In a markedly different manner, the same direct relationship is illustrated by the case of Port Townsend, which showed little growth and experienced few fires during the same period. In other words, it could be said that growth and destruction had reached a state of equilibrium in this bypassed urban centre.

By 1907, the first year for which an insurance surveyor's report is available, Port Townsend's population had stabilized at around 3000 people. The leading industries were a small brewery, a sash and door factory and a "fair-sized" sawmill which operated on an irregular basis. Besides remaining a port of entry for U.S. Customs, there was a government-operated Marine Hospital, and the town also served the garrisons of nearby Forts Worden, Casey and Flagler. The commercial district along Water Street had changed very little since the early 1890's. The insurance inspector dryly observed: "There are a considerable number of vacant mercantile buildings that have never been profitable, due to a boom many years ago when these stores were constructed and not because of any special depression in recent years," a point evidently made to discount the possibility of arson.  

The only city statute regarding the fire hazard was the original building code enacted in 1889:
All buildings or additions thereto hereafter (Jan. 20, 1889) erected within the fire limits shall have their outside walls made of brick and mortar, or iron, or stone and mortar, or of other non-combustible materials, and such outside walls shall extend to the top of and through the roof of said building, and the roof shall be covered with tin or some other non-combustible material.²

This attempt at a building code was totally inadequate, as had been demonstrated elsewhere, but was typical of other codes in the region drafted at the same time. The CDV buildings that resulted from its application were of mixed masonry quality—poor local brick and mortar was common—and had insufficient internal division walls, floor areas, parapet walls, roof thicknesses and a host of other shortcomings. Although almost half of the CDV was of brick and stone, it was interspersed with clusters (or "ranges") of frame construction, most of which were in poor condition or vacant, resulting in a possible conflagration hazard.

The Port Townsend volunteer fire department, once the city's pride, was similarly neglected. There was no "ready alert" fire engine, but the 1890 first size La France steamer (with no heater) was kept in reserve. A two-horse hose wagon with a suspended (or "drop-type") harness was available for immediate use, unless the horses happened to be away pulling the street sprinkling cart. There was also a small hook and ladder wagon which, because it had no horses, was party to an agreement with a nearby livery stable to provide a team on short notice for a modest $5.00 charge. Finally, three hand-drawn hose carts were dispersed in sheds on the bluff for use in house fires.

The department was staffed by two paid employees, a stoker and a driver, and two part-paid, the chief and the engineer. They were joined at alarms by 25 volunteers, who received $1.00 for the first hour of a fire, and 50 cents for each succeeding hour. Alarms were turned in on the old
Gamewell telegraphic system via four downtown boxes and eleven on the bluff.

While the deficiencies in Port Townsend's building codes and fire department suggest a lackadaisical approach to the fire threat, the city at least had an adequate urban water supply. The municipally-owned system was built in 1905-1906 by tapping into Snow Creek, eighteen miles away in the Olympic foothills. This gravity system of wood stave conduits fed a large reservoir on the bluff, 285 feet above the mercantile district. As a result, the city's sixty fire hydrants were well supplied, and CVD hydrants could produce 118 pounds per square inch of water pressure, a figure competitive with Seattle.³

In the years before the First World War, Port Townsend really made only one major advance in urban fire protection, the adoption of a new building code on December 29, 1911. This was evidently inspired by similar codes in the larger cities of the region. While it was described by the Washington Insurance Surveyor as an "exceptionally good building law," it only applied to structures erected after 1911.⁴ As a result, from the standpoint of urban fire protection, Port Townsend retained both the building technology and the volunteer fire department of its heyday in the 1890's for most of its urban history. The lack of any destructive conflagrations during this century is attributable to the lack of rapid urban expansion from the 1890's onward, and the attainment of equilibrium between a small stagnant urban core and its small stagnant fire department.

By 1920, the year in which most other cities of the region were still struggling to control urban fire, Port Townsend with only minimal investment in its fire department, and almost none in fire prevention, continued in a state of grace with the fire demon. A surge of war-related economic activity—mainly the shipping of timber from the Olympic Peninsula through
the port facilities—caused a population surge to almost 4000 in 1918, but by 1920 the figure had slipped back to 3000. This brief flurry of activity led to some more residential building on the bluff, but no change at all in the business district; any additional business activity simply expanded into existing vacant buildings, and quietly disappeared at the end of the decade (Map 14).

Among the minor improvements to the fire department, one was the adoption of a motor-driven hose wagon. This Christie motor truck was based at the main fire station, and carried 800 feet of hose and two 12 foot ladders. However, the 1919 surveyor's report warned that this vehicle was much too light for this type of service, especially when it was discovered that the fire chief was planning to pull one of the old hook and ladder wagons behind it! The organization of the department remained unchanged: one full-paid fireman lived at the main station with his family, while the chief and 24 volunteers remained on call. Other than these items, Port Townsend's ability to prevent or suppress fire was unchanged from the early 1900's.

Bellingham

The growth of Bellingham after 1900 represents a middle path between the economic fortunes of Seattle and Tacoma on the one hand, and Port Townsend on the other. After the depression of the 1890's, Bellingham recovered to become a regional urban centre with a diversified economy based on forest products, coal mining, fishing and agriculture, and excellent transportation facilities which included deep water piers, three railroads and a modern street railway system. In 1903, the northern town of Whatcom had merged with southern Fairhaven to produce the City of Bellingham, at the time the
MAP 14: FIRE MAP OF PORT TOWNSEND, 1922.
(Washington Survey and Rating Bureau.)
fourth-largest city in the state. The earliest extant insurance survey of Bellingham's morphological profile was done in 1907, and clearly shows the growth that had occurred following the consolidation. The population of the city was approximately 25,000 at this time, and the economic foundations were several very large lumber and shingle mills, two large fish canneries and a number of smaller manufacturing plants. The surveyor observed:

As a whole the city is very prosperous, but there is, as formerly, some vacant and unprofitable property in the mercantile district of the 'South side' formerly known as Fairhaven, a mercantile section of the city that does not appear to have profited by its consolidation with what was formerly Whatcom. In fact, virtually all of the commercial urban growth after 1900 would occur in the northern business district, leaving old Fairhaven in a similar situation as Port Townsend.

The business district of old Whatcom had begun to migrate eastward toward that of Sehome during the 1890's building boom. While this was encouraged by the natural tendency of these two business districts to coalesce in the wake of their political union in 1891, there was also a desire on the part of builders and investors to move the new brick and stone business blocks away from the all-wood buildings, planked streets, and pilings of the old post-fire business district on Whatcom Creek. With real estate available up the hill, and with a street railway to provide access to it, Bellingham's commercial builders and architects were reluctant to place high-value buildings among those destined to become "conflagration breeders." By 1907, the heart of the new business district could be described in terms of its street improvements: four blocks of Holly Street and five blocks of Elk (later State) were paved; everything else in the mercantile district was planked
and residential areas were only graded soil.\textsuperscript{9}

Bellingham entered the new century with minimal codes for building construction. The city building law, enacted in the 1890's, defined fire limits within the business district, and read:

No buildings except of brick or stone, brick and stone, brick and terra cotta, reinforced concrete or iron construction buildings shall hereafter be built, erected or placed within the fire limits; **no wooden building shall be enlarged or added to if such change would increase its size or shape.\textsuperscript{10}

Provision was made that any wooden building damaged more than 35 percent of its value should be torn down. As elsewhere, such a law was "wholly inadequate," according to the surveyor, and a new one was urgently needed.\textsuperscript{11}

The structural condition of Bellingham's major buildings during this period left much to be desired, from the fire hazard standpoint in particular. While one-third of the northern district and one-fifth of the southern were of conventional joisted brick and stone construction, the quality of much of the brick and most of the mortar was poor. As usual, all of the interior of these buildings--joists, floors and subfloors, roof trusses, internal walls, as well as furnishings--were of native softwoods, especially fir. Only two buildings in town were not of this construction: a new office block at Elk and Holly was brick with a light steel frame, and the telephone exchange was of mill construction. On the south side, many of the larger commercial buildings were wood-framed with brick veneer and others were intermixed with ranges of small frame buildings, providing dangerous conflagration exposures.\textsuperscript{12}

For a number of years after consolidation, Whatcom and Fairhaven retained their own separate waterworks and distribution systems. The northern system was supplied from Lake Whatcom via Whatcom Creek, while Fairhaven tapped Lake Padden for its supply. Both areas were well covered by fire
mains and hydrants. In the northern business district, there were 132 standard fire hydrants at spacings of 100 to 525 feet. On the south side, there were 51 hydrants at an average spacing of 250 feet. Pressure in the business districts was considered good and, in the generally higher residential areas, only slightly less so.13

Bellingham was served by volunteer fire companies until the consolidation of 1904, at which time a paid department for the entire city was created. However, the resulting department was totally inadequate for the needs of the city. In 1907, there were only eleven men, including the chief and engineer, and the only steam fire engine--an old third rate Silsby from the early 1890's--was kept in reserve rather than in active commission. There were two combination hose and chemical wagons, but only one was kept in commission because the city did not provide enough horses to pull it; there were also three hook and ladder wagons and a hose wagon, the former in reserve for lack of horses.

The main fire station was next to City Hall on Prospect Street. Here the chief, six men, one combination wagon, three horses, and the reserve steamer were based to cover the entire business district. Fairhaven was protected by one hose wagon with two horses, and five firemen, all at a small station on Harris Avenue. In addition, four hose carts were stored in residential areas to the west, north and east of the main station, and north of the Fairhaven station. Alarms were rung by a Gamewell telegraphic system connected to 41 alarm boxes, only twelve of which were on the south side.14

As might be expected, the Washington Insurance Surveyor was less than impressed by Bellingham's ability to prevent or control a major fire. Not only was the fire department deficient in manpower, apparatus and stations,
FIGURE 60: Bellingham's first fire engine, a third-class Silsby, was donated to Fairhaven by local investor Nelson Bennett in the early 1890's. This is its first public performance. (Center for Pacific Northwest Studies.)

FIGURE 61: By 1905, when this photo was made outside the main Bellingham Fire Department firehouse, the Silsby was a reserve engine. (Whatcom Museum of History and Art.)
but the high percentage of planked streets, the lack of a proper building law and the condition of most of the commercial blocks made the city a high-risk area. Also, city ordinances restricting the storage of explosives were poorly enforced, and because Bellingham was the central supply point for the mining districts of the North Cascades, "exceptionally large quantities of high explosives were found for sale in the mercantile district." 15

In the years following the 1907 report, Bellingham's fire suppression capabilities actually declined rather than improved, largely because of the block obsolescence of fire apparatus purchased in the early 1890's. By 1909, the Silsby steam engine was gone, a victim of old age. It was replaced by a new hose and chemical wagon and three horses, but at the same time the three hook and ladder trucks and all of the hose carts were retired. The only high spot during this period was the establishment of a new station at Maple and Indian Streets, intended to protect the State Normal School and surrounding neighbourhoods on Sehome Hill. However, it was manned by only five men, with a hose wagon and two horses. 16

Improvements to 1920

In the decade before 1920, Bellingham was finally forced to come to grips with its fire hazard, especially because of its conflagration potential in the older commercial districts. Fire loss figures are available only for 1916 to 1920, and these suggest that Bellingham's yearly number of fires per capita and fire losses per capita were roughly comparable to Seattle and Tacoma. 17

In its control over structural conditions and hazards, Bellingham made only halting progress before 1920. Building permits were not required until 1909, and there was no regular building inspector, although the fire chief
regularly checked installation of heating apparatus in new construction. Building laws were initially lax: a 1906 ordinance requiring protected openings in masonry buildings (shutters or wired glass) was not enforced, but a 1908 law requiring standpipes in buildings four stories or more, and fire escapes in those of three or more was enforced "in a mainly satisfactory manner." A 1915 law establishing fire limits restricted frame construction in both the first and second zones, but was inadequate in controlling use and replacement of combustible shingle roof coverings in the outer zone.  

Bellingham's commercial core consisted of fourteen blocks and 163 buildings in 1920, of which 79 percent were of joisted brick construction (Figures 62 and 63). These buildings suffered from the same shortcomings as their brethren in Seattle: too many exposed vertical and horizontal openings, inadequate party and fire walls, low roof parapets, and too few fire escapes. Worst of all, they were intermingled with frame construction, comprising 17 percent of the district. Only three buildings in the commercial district were of modern fireproof construction: a three-story office block, a six-story furniture store, and the 1912 Federal Building. The two former buildings were of reinforced concrete, while the Federal Building was a three-story steel frame protected with terra cotta and concrete (Figure 66).  

The conflagration hazard in Bellingham's mercantile district was considered high in the 1920 NBFU Report. In spite of level street grades, good pavement, good accessibility via 20-foot alleys, and generally low building heights, a conflagration was possible in most blocks because of the amount of frame construction and the lack of fire resistive features in the joisted brick construction. Compounding the problem were extensive overhead electrical wires, inadequate siting of the few good buildings as fire stops
FIGURE 62: The Lighthouse Block, a typical 1890's vintage joisted brick and stone bank and office building. The survival of such structures in the CVD greatly increased the fire department's burden in the early 1900's. (Center for Pacific Northwest Studies.)

FIGURE 63: A view of Elk (later State) Street in the 1920's showing the reconstruction with joisted brick during the early 1900's. (Center for Pacific Northwest Studies.)
FIGURE 64: The 1908 Flatiron Building, or Hamilton Block, was Bellingham's first steel and concrete high rise building. Special fire protection measures included a roof-top water tank connected to interior standpipes. (Center for Pacific Northwest Studies.)
FIGURE 65: Insurance plan of the Flatiron Building from the 1913 Sanborn Atlas. Blue colour denotes reinforced concrete construction. (Center for Pacific Northwest Studies.)

FIGURE 66: Insurance plan of the 1913 Federal Building. Orange colour denotes "fireproof construction: building stone over a steel frame with a tile roof." (Center for Pacific Northwest Studies.)
and an undermanned fire department.20

Bellingham's industrial plants were of less concern at this point. Most of the saw and shingle mills and salmon canneries had automatic sprinklers and "considerable other protection," and fires in these locations could either be controlled or, at worst, contained to a single plant. An exception were the mills and lumberyard on the waterfront adjacent to the mercantile district, where a major fire could spread, via intervening frame construction, to the CVD. Residential areas were a conflagration hazard chiefly because of their shingled roofs, and then only during the dry summer months; the dispersed nature of Bellingham's neighbourhoods, a distinctive feature of the city, greatly reduced this risk.21

If Bellingham's morphological structure in 1920 offered little protection from the fire hazard, then its fire suppression facilities offered even less. The fire department had grown to a total fire force of only 31 men, for a city population of 25,500. There is reason to believe that something more than inadequate funding was involved, however, for reference was frequently made to the difficulty of finding "the proper class of men for fire department work" owing, perhaps, to the war-related labour shortage of preceding years. In any case, the department was reorganized into a two-platoon system, to more effectively utilize the limited manpower, with shifts during every ten or fourteen hours.22

Another way to stretch the fire department's available personnel was the complete motorization of the organization. The core of the department was three motorized hose wagons, dispersed to each of the three urban fire stations. In addition, there was a 1909 model Ahrens steam fire engine in reserve, and an automobile for the fire chief which carried a 20-gallon chemical tank and 200 feet of hose. Note that there was no regular engine
company, nor was there a fireboat (Maps 15 and 16).

Bellingham was served by a Gamewell alarm system that had been installed in 1904. Unfortunately, there were only fifty alarm boxes in the entire city. The main business thoroughfare, Holly Street, had only four boxes the entire length of the street, leaving buildings to the east and west over 600 feet from a box. Coverage of residential areas was also poor, and the sawmill suburb of Silver Beach on Lake Whatcom relied entirely on the telephone for fire alarms.

In the conclusion to the 1920 NBFU surveyor's report, most of these shortcomings were directly addressed, with the weaknesses in the fire department and the lack of building laws the priority items. Suggested improvements to the fire department included: formation of an additional hose company for Lake Whatcom, and a ladder company for the CVD; an increase in the number of firemen in each company; and an increase in the number of alarm boxes, especially in the CVD. The surveyors also recommended that Bellingham immediately adopt a building code based on the new NBFU code, that a building department be established to oversee enforcement of the building laws and, finally, that combustible roof coverings be "prohibited throughout the city on all new or repaired roofs."

With regard to this latter point, perhaps nowhere else in this study is the divergence between eastern expectations and western economic reality better illuminated, for the roof coverings alluded to were mainly red cedar shingles--one of the city's leading manufactured products! Most of Bellingham's homes and not a few commercial buildings had shingle roofs for the simple reason that it was the least expensive and most durable roof covering available, a situation not to change appreciably until after World War II.
MAP 15: BELLINGHAM FIRE MAP, NORTHERN CVD 1920.
(Washington Survey and Rating Bureau.)
MAP 16: BELLINGHAM FIRE MAP, FAIRHAVEN CVD, 1920.
(Washington Survey and Rating Bureau.)
Conclusions

In the years after 1900, the importance of technology and investment capital in controlling the urban fire hazard relegated Bellingham and Port Townsend to secondary roles in the examination of the thesis. Yet, in spite of this, their experience with the threat of urban fire still leaves them with examples to impart that justify their continued inclusion.

The lack of any appreciable industrial or commercial development in Port Townsend after 1900 (or 1892, for that matter) ensured that, in the absence of a major conflagration, there would be little morphological evolution in the CVD. To the delight of architectural preservationists and tourists alike, this has been the case, and the city remains a window into the urban past of the Pacific Northwest. Much of the reason for this survival may be attributed to the gradual adoption of fire suppression technology, especially motorized fire engines and telegraphic/telephonic alarms, that allowed the preservation of buildings which were--and still are--serious fire hazards.

Bellingham, on the other hand, followed more closely the pattern set by Seattle and Tacoma, although its smaller size and lack of money for large-scale fire suppression equipment was apparent. Here street improvements, land use laws and building codes followed essentially the same pattern as they had in larger cities, but were usually several years behind. While these comments are directed at the northern CVD of Bellingham--old Whatcom and Sehome--the case of Fairhaven on the south side more nearly parallels that of Port Townsend.
CHAPTER 10

NOTES


2. Ibid.

3. Ibid.


5. Ibid.


9. Ibid.

10. Ibid.

11. Ibid.

12. Ibid.

13. Ibid.

14. Ibid.

15. Ibid.

16. Washington Surveying and Rating Bureau, "Bellingham," December 5, 1913; April 7, 1918.


18. Ibid., 14.

20. Ibid., 17-18.

21. Ibid., 18.

22. Ibid., 9.

23. Ibid., 23.
CHAPTER 11

TACOMA

By 1905, Tacoma was firmly entrenched as Washington's "second city," with an estimated population of 72,900--less than half of that of Seattle. The city's failure to profit during the Alaska-Yukon gold rush is shown by comparing Tacoma's 1890 and 1900 population figures--36,006 and 37,714, respectively--but still, the doubling of the city's size from 1900 to 1905 was indicative of a dynamic period of urban growth. Principal industries were lumber and shingle mills, wood-working establishments, railroad repair ships, cereal milling and meat packing.

Unlike the diversified industrial and service economy of Seattle, Tacoma was destined to remain a "company town" until the middle of this century. Dominated by the Northern Pacific Railroad until the turn of the century, the creation of the Weyerhauser Timber Company in 1900 from the railroad's timberland grants was to make Tacoma the corporate headquarters for the largest timber company in the world. Only slightly less important was the acquisition of another local firm, the Tacoma Smelter Company, by the Guggenheim interests of New York. Originally built to handle ores from Idaho and Montana, the American Smelting and Refining Company operation at Tacoma became one of the largest in the world during the early twentieth century. As a result, Tacoma's economy was completely dominated by these large corporations for the years before 1920.
Tacoma's Fire Hazard to 1905

No doubt spurred by the doubling of the city's size between 1900 and 1905, in the latter year Tacoma adopted its first formal building code. This law was generally similar to that of Seattle, described earlier, but was much less explicit. Some of its major features were:

Fire Limits: the CVD was designated as Zone "A," and the surrounding built-up area as Zone "B," each with certain construction limitations [as follows]; elsewhere, construction was unregulated.

Fireproof Construction: required for tenements of six or more stories, public halls (except theatres) and vaults for mill shavings and refuse within Zone "A."

Mill Construction: no limits except for height.

Joisted Construction: no limits except as above.

Frame Construction: prohibited within Zone "A"; limited to two stories in Zone "B"; existing frame buildings in Zone "A" more than 35% destroyed to be removed.

Heights: limited as follows:

- a) Fireproof (steel skeleton): 200 feet
- b) Fireproof (masonry): 120 feet
- c) Mill: 102 feet
- d) Joisted: 79 feet (five stories if tenement)
- e) Frame: 50 feet

This 1905 building code, while it did have some advantages, was woefully deficient in other areas. The main shortcomings were no limitations on floor areas, parapet heights, unprotected openings in division walls and an absence of stairway and elevator protection. Most serious, however, were the excessive heights permitted for non-fireproof buildings; note that the specified height limitations were obviously designed to accommodate existing buildings! Also, the weak tenement housing rules may reflect pressure from the powerful local industrial leaders.
In the 23 blocks comprising Tacoma's mercantile core in 1905, only one percent of the buildings were of fireproof construction, while five percent were of mill construction, 65 percent joisted and 29 percent frame. While these figures would seem to suggest a potential conflagration hazard, such was not the case. The reasons for this are of significant interest to the North American urban geographer.

Prevented by the 1855 Indian treaties from platting the tideflats at the head of Commencement Bay, railroad surveyor James Tilton was forced to lay out a long, narrow business district atop the bluff to the south. Of the three 100-foot wide main avenues traversing the district, Pacific Avenue was the principal commercial street and included three-quarters of all the business buildings. The blocks were all small, none exceeding 120 feet in width, and alleys were unnecessary because the majority of the buildings were accessible from the front and rear via the wide avenues. Walls between the buildings were thus blank (i.e., non-communicating) below the roofline and parapeted above. The aforementioned exposure problems applied only to end-to-end exposures across relatively wide streets (rather than narrow alleys as in Seattle).

Tacoma's conflagration hazard was further lessened by the fact that the buildings were relatively small in area, and low in height. The two largest buildings, both of six stories, were also the newest, and of fire-proof construction. Two of the major department stores were of mill construction, but averaged only two or three stories in height, and were easily accessible by the fire department. As a consequence, the 1905 NBFU report on Tacoma was able to note that "The features usually contributing to the conflagration hazard are largely absent in this city."
Fire Department

An examination of the Tacoma Fire Department of 1905 provides some interesting contrasts with that of Seattle for the same period. The size of the department was 59 men, organized into four engine, four hose, one ladder and one chemical company. An attempt was also made in 1897 to administer the department by the civil service method, but this was "later abolished by popular vote." As a result the fire chief was a political appointment of the mayor, and "Most of the officers and many of the men were removed at a recent change of administration," a real hindrance to training and morale. 7

Tacoma was quite stingy in appropriating funds for its fire department, a point which could well be related more to politics than to perception of a fire hazard. The 1904 per capita expenditure for the department was only ninety cents, well below the nationally recommended $2.00 figure. The size of the Tacoma Fire Department had been so drastically reduced during the 1890's that it was just regaining the standards it had maintained in 1893, its peak year. The major pieces of fire apparatus were four steam engines, three of which dated from 1889-1890; the remaining hose, combination and ladder wagons were of similar vintage. This equipment was drawn by 32 horses dispersed among four CVD fire stations; outlying residential areas were served only by hand-drawn hose reels.8

Tacoma was distinctive in the amount of private fire protection it had available. Although there was no city fireboat, the Tacoma Tug and Barge Company had equipped one of its towboats with a steam pump for waterfront firefighting. The major sawmills and the Northern Pacific car shops all had their own fire departments, pumps and water systems. All of these, especially the fireboat, would be capable of rendering assistance at some
MAP 17: TACOMA FIRE MAP, 1906,
Showing building districts, fire department locations and water systems.
(American Insurance Association.)
locations in the event of a serious fire.

All of these fire suppression capabilities were threatened in 1905 by what insurance surveyors considered an inadequate water supply. While Tacoma's waterworks were owned and operated by the city, the source of supply was based entirely on surface sources--Commencement Bay and several small reservoirs--and wells. The system of water mains in the CVD was capable of providing adequate pressure for fire use, but there were far too few hydrants and the lack of storage capacity threatened a total failure of the system in the event of a large fire.9

Controlling the Fire Hazard, 1906-1909

In the four years between the NBFU's first and second reports on Tacoma, the city undertook to improve its "fire image," particularly in the area of structural hazards. In September of 1909, Tacoma adopted a new building code based on that of San Francisco. Compiled by a committee of three architects, two contractors and a representative of the Washington Surveying and Rating Bureau, the eastern underwriters were nevertheless unhappy with the fact that it was not as good as it could have been.10

In reviewing Tacoma's structural hazards in the fall of 1909, the underwriters were pleased with the comprehensiveness of the new code, but felt that the few minor omissions that existed would still "... allow buildings lacking in fire resistance to be erected."11 The major concerns were essentially the same as those of 1905: heights and areas of non-fireproof (joisted brick) commercial buildings were 50 to 100 percent in excess of the NBFU's newly-evolving national standard, insufficient wall thicknesses for commercial blocks, a lack of fire escape requirements, and inadequate
insulation of posts and beams. As a result, Tacoma's overall structural condition was considered to be "poor." 12

In a separate assessment of the conflagration hazard in the CVD, there was concern over the lack of fire protection measures in the 85 percent of "structurally deficient" joisted brick buildings. While the inspector felt the risk of fire was high in individual buildings, however, the unusual nature of the city's street pattern meant that "the usual building-to-building exposures which readily assist in developing conflagrations" are missing, given a rapid and effective response by the fire department. Concern was expressed, however, that if these buildings were replaced with higher ones built to the inadequate 1909 code, this minimal height in proportion to street width could soon develop a conflagration hazard beyond the capability of even a materially improved fire department. 13 Outside the CVD, the well-equipped private fire protection systems of the industrial area, especially the waterfront sawmills, the Northern Pacific Railroad car shops and the smelter, rendered them much less of a conflagration danger. As elsewhere in the Puget Sound region, residential areas of closely-grouped and shingle-roofed homes were mentioned as a minor hazard, again given a rapid response from the fire department. 14

Fire Department Improvements

Like Seattle, Tacoma had been stung by the criticism of its fire department in 1906 and, in the years following, began to upgrade its equipment. On paper the improvements looked good: two engine companies, one hose company and one ladder company were added; five new fire stations were built; several automobile engines were added; and manning was increased by 44 men. The city council also ordered the construction of a fireboat in
MAP 18: TACOMA CVD FIRE MAP, 1910.
(Washington Survey and Rating Bureau.)
1909, to better protect the long and exposed waterfront industrial area.

As was the case with the new building code, however, Tacoma's efforts at fire suppression were still considered inadequate. The major problem appeared to be political: although the fire department had adopted civil service rules in 1909, the NBFU noted that the new rules—especially those for hiring—were not being followed. There was also evidence of a continuing political struggle between the fire chief and the city council, the latter trying to remove the chief twice in 1908 for "political activity." The department's internal political squabbles also had a detrimental effect on training of new personnel.

Tacoma's fire suppression capability was further degraded by an old and generally inadequate water supply system. Although the system was municipally owned and adequate for most water needs, it was far from ideal for firefighting purposes. Because of the age of the mains, there was inadequate water pressure to properly operate the few sprinkler systems extant in the CVD, and hydrant spacing was too far apart. Of an older design than Seattle's, Tacoma's hydrants were also prone to freezing and had smaller fittings, thus releasing a smaller stream of water.

**Tacoma in 1920**

Unlike the first decade of the twentieth century, Tacoma's growth slowed and began to stabilize in the years before 1920. Population increased from 82,972 to 96,965 since 1910, largely as a result of the effect of war-related production increases in shipyards, machine shops and the sawmills and smelter. Along with this stabilization came a reduction in fire losses: from 1915 to 1919, Tacoma's average loss from fire was $2.37
per capita, compared to $2.09 for Bellingham and $3.39 for still-expanding Seattle. The directness of the relationship between higher fire losses and periods of rapid growth is to be noted here, because the 1920 NBFU report on Tacoma suggests that relatively few improvements had been made since 1910. The following is a brief consideration of the major areas of urban fire control.

Tacoma adopted a new municipal building code in 1919, one based largely on the specifications of the National Board Code of 1905. However, this was no overnight cure for the previously described problems in the CVD since it only applied to new construction, and of this there was considerably less than in past decades. Many of the shortcomings of the previous code were retained: for instance, the new code finally restricted individual internal building areas, but these limitations were "... generally 50 to 100 percent in excess of those defined by good practice." (In other words, the Tacoma city government simply legalized one of its most serious fire hazards!)

The underwriters' report concluded that, while far from ideal, Tacoma's attempt to legislate better fire prevention was a moderate success. Also, some frame buildings in the CVD had been removed for newer fireproof construction. But despite these improvements, the report suggested that Tacoma was still "structurally weak" because of the large number of "non-fire restrictive" buildings left in the business district.

Much more effort was channeled into fire department improvements during this period. By 1920, the size of the force had grown from 101 to 306, with a corresponding increase in municipal expenditures on equipment. The entire department was motorized in 1919 with automobile engines and placed on a two-platoon basis, thus providing a rapid response to building fires.
FIGURE 67: By 1912, steel frame buildings were beginning to appear in Tacoma's CVD. These two blocks suggest the intermingling of old and new, except the Federal Building has a block all to itself. (Washington Survey and Rating Bureau.)

FIGURE 68: Detailed insurance plan of a typical post-1900 steel and concrete commercial building in Tacoma. Furniture firms were among the earliest converts to "fireproof" construction due to their substantial fire risk. (Washington Survey and Rating Bureau.)
in virtually every corner of the city. Even though the 1910 fireboat project had evidently failed to materialize, the waterfront was effectively covered by a contracted private towboat.22

The end result of Tacoma's efforts from 1901 to 1920 to control the urban fire hazard was notably similar to her sister city, Seattle. In Tacoma's CVD, a combination of weak construction (from a fire standpoint), a generally deficient water system and a fire department that for most of the period had inadequate equipment, and training and morale problems resulted in occasional serious individual building fires.23 At the same time, a major conflagration was deemed improbable owing to the absence of severe mutual exposures, a legacy of James Tilton's street grid. Finally, the importance of private fire protection by lumber, railroad and other companies in the inherently flammable industrial areas of the waterfront is to be noted.
MAP 19: TACOMA CVD FIRE MAP, 1920.
(Washington Survey and Rating Bureau.)
CHAPTER 11

NOTES


5. Ibid., 30.

6. Ibid., 34.

7. Ibid., 17.

8. Ibid., 18.

9. Ibid., 39.


11. Ibid., 29.

12. Ibid., 29.

13. Ibid., 33.

14. Ibid., 34.

15. Talbot and Decker, 100 Years of Firefighting, 45-46.


17. Ibid., 39.


22. Ibid., 17.

23. Talbot and Decker, 100 Years of Firefighting, 51-60.
Fire has been a significant factor in the physical growth and development of virtually every North American city. This is supported by even a casual consideration of the urban morphogenesis of such places as Boston, New York, Chicago or San Francisco. On the Pacific Northwest Coast, the compressed nature of regional urban history has meant that large conflagrations occurred relatively recently, and are well-remembered parts of each city's development. Seattle historian Paul Dorpat recently noted that every few decades, with the help of "earthquakes, fires, nervous engineers and metropolitan dreamers," the cities of the West Coast have been rebuilt.\(^1\) This study has concentrated on the effects of at least two of these.

The often drastic change in natural environment and available building materials experienced by the first European settlers in North America began a tradition of poorly-constructed wood-frame building which was to characterize the earlier phases of urban development in every corner of the continent. In describing American vernacular landscapes, J. B. Jackson suggested that "... short-lived communities composed of flimsy and undistinguished architecture" essentially defined the early North American city.\(^2\)

Co-equal with this tendency toward fire-prone building was the need to use fire as a tool for clearing land, heating houses and buildings, and running the early steam age machinery that was for Western cities their raison d'etre. This resulted in a certain familiarity—even casualness—with fire that, when combined with early forms of urban building, often led to serious urban conflagrations.
Cities of Kindling, 1851-1900

The urban fire hazard in the study cities of the Pacific Northwest coast frontier was characterized before 1900 as being a local problem, and could therefore only be dealt with using limited local resources. That these resources were inadequate and did little to check fire losses during this period is suggested in Part II. The following is a summary of the way that fire affected the main components of regional urban morphology during the years before the end of the nineteenth century.

Street Patterns

City street patterns and widths were the least affected of any morphological component by fire, or the threat of fire. As suggested, only rarely are street patterns ever changed after they are in place. Only in post-fire Seattle was an attempt even made to improve an existing pattern, and that was only by slightly widening the north-south streets of the CVD to reduce overhanging building exposures on the steep east-west slopes. The advantage gained here was lost almost immediately by erecting taller buildings of "fireproof" brick and stone which, according to insurance surveyors, were as much a conflagration hazard as the buildings they replaced.

Street improvements owing to topographical problems were also faced by Seattle. These were dealt with by a series of regrading efforts which lowered street grades in the area surrounding the CVD and provided fill for industrial developments to the south of the business district. But the effect of those regrades on fire prevention was minimal, although it did facilitate access by fire department equipment and personnel and, hence, fire suppression.
The convoluted street grids of regional cities were the result of the application of a standard rectangular street grid on the urban site with little or no regard for topography. The American passion for the orderly grid ignored the problems when different grids adjoined, as was the case in Seattle and Bellingham, and the intensity of the attachment is illustrated by the overwhelming rejection of the Olmsted Plan for Tacoma. Interestingly, the grid chosen to replace the curvilinear plan was by far the most successful in terms of fire suppression access, if not in outright prevention. Whether or not James Tilton's design intended to consider the fire hazard must for now remain an unanswered question (although the possibility is strong, given the later date of the plan and Tilton's long railroad and military experience).

A final point regarding streets is that the efforts to pave them greatly enhanced access by fire department equipment. This street improvement was done initially not by urban governments, but by electric streetcar companies as a condition for the granting of a right-of-way. So popular was this paving that, after 1900, municipal authorities began to expand it into the suburbs and industrial areas, improving fire suppression access and, coincidentally, beginning the decline of the street railways. The essential point here is that fire access was a "bonus" rather than the prime reason for street resurfacing.

Land Use

During the early phases of study area settlement, land use was totally unregulated. Both houses and stores clustered around the industrial heart of each town, in all cases a sawmill. The arrival of steam railroads after the mid-1880's created a natural buffer zone of open space between the mills
and commercial districts, and the arrival of electric street railways soon afterward led to the dispersal of residential areas around the commercial district. Such economically-instigated land use separation was merely formalized by the earliest fire hazard-inspired zoning laws of the 1890's. In post-fire Seattle, for instance, the establishment of fire limits was to define the CVD for insurance and legal purposes; similar laws were developed for Tacoma and Bellingham, while Port Townsend lagged several decades behind.

Building Technology

Fire's most apparent effect on regional urban development and morphology was in the area of changing building technology, but this transition actually occurred later than the thesis originally suggested. The reconstruction of Seattle in brick and stone after 1889 is often offered by urban historians as a response to the fire hazard of the wood-frame era. But the preceding account suggests that this type of building was a response to other factors besides fire, chiefly because of the fact that Seattle had already begun to build brick structures well before 1889, and because Port Townsend built an identical business district without the "benefit" of a major fire. This implies that external economic forces were behind this transition rather than merely the fear of urban fire. Included here would be factors including availability of capital for investment and a strong desire to create a more "permanent" (or Eastern-appearing) business district to attract railroads and investors.

A major corollary to the thesis is the "timing theory": at any given point in urban development there is an economic and technological limit to what can be built. Therefore, the timing of urban conflagrations dictated
what type of replacement structures would follow. This is illustrated by
the case of Bellingham, where an 1885 conflagration meant reconstruction
in identical wood-frame buildings. Similarly, the post-fire joisted brick
buildings of Seattle were identical to those that had preceded them. In
short, a technological revolution is of more import than a conflagration
experience, as later events would prove.

Finally, it is to be noted that Seattleites honestly did think they
were replacing their destroyed business district with a "fireproof" build-
ing type. This misconception was not a regional one but national as well,
as the cases of Baltimore (1905) and San Francisco (1906) well illustrate.

It remained for the science-based and fire insurance-inspired move to steel
and concrete after 1900 to truly make building technology a major fire pre-
vention factor.

The years before 1900 may be summarized as a period in which attempts
to control urban fire by means of prevention through the preceding morpho-
logical elements were largely unsuccessful. Fire suppression as a means of
control was generally of minimal significance until the late 1890's, when
improvements in street access and water systems, in conjunction with more
efficient steam fire engines, began to deal more effectively with the
suppression of urban fires.

Cities of Steel and Concrete, 1901-1920

The most obvious change in the regional approach to the urban fire
hazard after 1900 was the tremendous influence exerted on local builders,
businessmen and municipal figures by the fire insurance industry. During
this period, the physical form of three of the four study cities changed
drastically to conform to Eastern-developed standards of fire-resistant
construction.
Street Patterns

The discovery that the ingredients of building concrete were as indigenous to the Pacific Northwest coast as Douglas fir and cedar revolutionized the street grids of the region and encouraged the adoption of the automobile for urban transport. While the improvements in access to both commercial and residential areas were designed to enhance commerce and real estate sales, they had the side effect of allowing fire departments to disperse into areas where access had previously been difficult. The net result was that fires could be more quickly responded to by more powerful and effective steam, then gasoline-powered fire units.

Land Use

Under strong pressure from insurance underwriters, fire limits and building zones were created and stringently described. These served to legalize distinctions between industrial, commercial and residential areas in ways never before possible. For the first time in American history, municipal government could effectively regulate what could and could not be built, and where. Thus, the present-day concept of zoning land usage in the study area is a direct descendent of the fire underwriter's reports of the first two decades of this century.

Building Technology

The new steel-skeletoned commercial blocks of concrete and terra-cotta that began to appear in Northwest business districts after 1900 were much more expensive to erect than their joisted brick predecessors. Nevertheless, when the external control of fire insurance rates is considered, such buildings were also more economical to build. As a result, by 1920 the main streets of Seattle, Tacoma and Bellingham were visually indistin-
guishable from cities of comparable size elsewhere in the United States.

Yet while such buildings were individually safer from destruction by fire, there remained the problem of "leftover" buildings--or "conflagration breeders," as they were ominously termed--from preceding phases of morphological development. The result was a slow but definite relocation of newer buildings away from the old CVD.

In Seattle, the move of the business district and its new-technology buildings to the north along First through Fourth Avenues, was an attempt to escape the block obsolescence of the Pioneer Square district of the 1890's. The same movement had occurred fifteen years before in Bellingham, when investors seeking to erect joisted brick buildings in anticipation of the railroad's arrival avoided the practically-new wood-frame CVD near Division Street and moved away up the Holly Street hill. In Tacoma, where the obsolete joisted-brick CVD was so well preserved by the narrow city blocks and the Tacoma Fire Department, newer construction went up within the older district, but usually with great care in siting and protection.

Conclusions

The role of the urban fire hazard in the morphogenesis of the study area was more subtle and indirect than the statement of the thesis suggested.

Fire seldom affected street patterns, except in the case of Seattle, but street improvements after 1900 greatly enhanced fire suppression. Fire had a similarly indirect effect on urban land use, but even more important were ongoing economic forces which were beginning to define separate industrial, commercial and residential zones before conflagration was a major threat.
The most obvious effect of the fire hazard on urban form was in building technology. While it cannot be denied that other forces were at work in the transition from wood-frame to joisted bricks to steel and concrete, the need to protect the sizeable financial investment in these latter structures with fire insurance meant that building materials and techniques perfected elsewhere were adopted here in order to achieve affordable insurance rates.

The inadequacy of the above fire prevention measures in the study area for the bulk of the study period was, in large part, caused by the survival of older, more fire-prone buildings. In most North American cities, but especially in the Pacific Northwest, there was a tendency to compensate for the lack of prevention with more attention and money directed at suppression. The result was that the region became a centre of firefighting technology, and led the nation in the adoption of motorized equipment, fireboat technology and firefighting tactics, as well as telegraphic and telephonic alarm systems. In a sense, then, rapid suppression was to become conflagration prevention and, by the 1950's, almost a form of fire prevention in itself. This is in contrast to Europe, where fire suppression technology has lagged owing to the thoroughness of fire prevention technology.

Although fire did not play the leading part in determining the urban form and structure of the Pacific Northwest's leading cities, it certainly played a supporting role that can no longer be ignored by urban geographers and historians. Further, the amount and quality of potential research material generated by various agencies concerned with urban fire must be considered, along with more familiar sources, if we are ever to more fully comprehend why we no longer live in "cities of kindling."
CHAPTER 12

NOTES

1. Dorpat, Seattle: Then and Now, #94.

2. Jackson, Discovering the Vernacular Landscape, 86-87.
APPENDICES

A. Seattle Fire Statistics, 1906
B. Seattle Fire Statistics, 1910
C. Seattle Fire Statistics, 1920
D. Tacoma Fire Statistics, 1906
E. Tacoma Fire Statistics, 1910
F. Tacoma Fire Statistics, 1920
B. Bellingham Fire Statistics, 1920
APPENDIX A

Seattle Fire Statistics, 1906

1) Seattle Fire Record, 1900-1905

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2) Seattle Fire Losses, 1900-1905

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3) Seattle Fire Companies and Equipment, 1906

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<th>Horses</th>
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(totals) 21 11 19 126 33

4) Fire Alarm Response Plan, 1906

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1) Seattle Fire Companies and Equipment

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### Fire Alarm Response Plan, 1910

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APPENDIX C

Seattle Fire Statistics, 1920

1) Seattle Fire Companies and Equipment, 1920

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2) Fire Alarm Response Plan, 1920

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</tr>
<tr>
<td>Apartment and Dense Residential</td>
<td>1</td>
<td>2-4</td>
<td>2-4</td>
<td>1-2</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4-7</td>
<td>6-7</td>
<td>2-3</td>
<td>3-6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5-10</td>
<td>8-10</td>
<td>2-4</td>
<td>3-7</td>
</tr>
<tr>
<td>Dispersed Residential</td>
<td>1</td>
<td>1-2</td>
<td>2-3</td>
<td>0-1</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2-5</td>
<td>4-6</td>
<td>1-2</td>
<td>3-5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5-8</td>
<td>7-9</td>
<td>2-3</td>
<td>4-8</td>
</tr>
</tbody>
</table>

APPENDIX D

Tacoma Fire Statistics, 1906

1) Tacoma Fire Record, 1906

<table>
<thead>
<tr>
<th>Year</th>
<th>Alarms</th>
<th>one building</th>
<th>2 buildings</th>
<th>3 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>209</td>
<td>162</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>1901</td>
<td>229</td>
<td>173</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1902</td>
<td>279</td>
<td>152</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>1903</td>
<td>212</td>
<td>164</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1904</td>
<td>345</td>
<td>199</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

2) Tacoma Fire Losses, 1906

<table>
<thead>
<tr>
<th>Year</th>
<th>Building &amp; Contents Gross</th>
<th>Contents Insured</th>
<th>Average Gross Loss per fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>$ 88,000</td>
<td>$ 52,000</td>
<td>$ 444</td>
</tr>
<tr>
<td>1901</td>
<td>45,000</td>
<td>32,000</td>
<td>204</td>
</tr>
<tr>
<td>1902</td>
<td>128,000</td>
<td>102,000</td>
<td>482</td>
</tr>
<tr>
<td>1903</td>
<td>310,000</td>
<td>234,000</td>
<td>1,655</td>
</tr>
<tr>
<td>1904</td>
<td>43,000</td>
<td>36,000</td>
<td>137</td>
</tr>
</tbody>
</table>
3) Tacoma Fire Companies and Equipment, 1906

<table>
<thead>
<tr>
<th>Company Type</th>
<th>Number</th>
<th>Engines</th>
<th>Wagons</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>4</td>
<td>4</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Hose</td>
<td>4</td>
<td>---</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Ladder</td>
<td>1</td>
<td>---</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Chemical</td>
<td>1</td>
<td>---</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>(totals)</td>
<td>10</td>
<td>4</td>
<td>10</td>
<td>53</td>
</tr>
</tbody>
</table>

APPENDIX E

Tacoma Fire Statistics, 1910

1) Tacoma Fire Companies and Equipment

<table>
<thead>
<tr>
<th>Company Type</th>
<th>Number</th>
<th>Engines</th>
<th>Wagons</th>
<th>Men</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>55</td>
<td>36</td>
</tr>
<tr>
<td>Hose</td>
<td>4</td>
<td>---</td>
<td>4</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>Ladder</td>
<td>2</td>
<td>---</td>
<td>2</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Chemical</td>
<td>1</td>
<td>---</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>(totals)</strong></td>
<td>14</td>
<td>7</td>
<td>14</td>
<td>94</td>
<td>51</td>
</tr>
</tbody>
</table>

2) Fire Alarm Response Plan, 1910 (first alarm only)

<table>
<thead>
<tr>
<th>District</th>
<th>Engines</th>
<th>Hose Wagons</th>
<th>Ladder Wagons</th>
<th>Chemical Wagons</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD</td>
<td>2</td>
<td>2</td>
<td>1-2</td>
<td>1</td>
</tr>
<tr>
<td>Industrial</td>
<td>2-3</td>
<td>2-3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Apartments</td>
<td>2</td>
<td>2-3</td>
<td>1</td>
<td>0-1</td>
</tr>
<tr>
<td>Residential</td>
<td>0-1</td>
<td>1-2</td>
<td>0-1</td>
<td>0-1</td>
</tr>
</tbody>
</table>

# APPENDIX F

Tacoma Fire Statistics, 1920

1) Tacoma Fire Companies and Equipment, 1920

<table>
<thead>
<tr>
<th>Company Type</th>
<th>Number</th>
<th>Engines</th>
<th>Wagons</th>
<th>Automobile</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>10</td>
<td>1</td>
<td>---</td>
<td>9</td>
<td>86</td>
</tr>
<tr>
<td>Hose</td>
<td>2</td>
<td>---</td>
<td>---</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Ladder</td>
<td>2</td>
<td>---</td>
<td>---</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>(totals)</td>
<td>14</td>
<td>1</td>
<td>---</td>
<td>15</td>
<td>114</td>
</tr>
</tbody>
</table>

2) Fire Alarm Response Plan, 1920 (first alarm only)

<table>
<thead>
<tr>
<th>District</th>
<th>Engines</th>
<th>Hose Wagons</th>
<th>Ladder Wagons</th>
<th>Chemical Wagons</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Industrial</td>
<td>3-4</td>
<td>0-1</td>
<td>1</td>
<td>3-4</td>
</tr>
<tr>
<td>Apartments &amp; Dense Residential</td>
<td>2</td>
<td>0-1</td>
<td>0-1</td>
<td>1-3</td>
</tr>
<tr>
<td>Residential</td>
<td>0-1</td>
<td>0-1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

APPENDIX G

Bellingham Fire Statistics, 1920

1) Bellingham Fire Companies and Equipment, 1920

<table>
<thead>
<tr>
<th>Company Type</th>
<th>Number</th>
<th>Engines</th>
<th>Wagons</th>
<th>Automobile</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>0</td>
<td>(1)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>in reserve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hose</td>
<td>3</td>
<td>---</td>
<td>0</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>(totals)</td>
<td>3</td>
<td>(1)</td>
<td>0</td>
<td>3</td>
<td>22</td>
</tr>
</tbody>
</table>

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BOOKS


ARTICLES


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THESES AND DISSERTATIONS


